INDIA RUBBER WORLD

OUR 62nd YEAR

LIC LIBRARY
MAR 30 1951
DETROIT

A BILL BROTHERS PUBLICATION

MARCH, 1951

For Quality Butyl Tubes you need the Best Smooth-Out Black...

CABOT

STERLING S O

BETTER SPLICING
SMOOTHER EXTRUSION
FASTER CURE
HIGHER MODULUS
LESS CHAFING

CABOT

GODFREY L. CABOT, INC., Boston 10, Mass.

Plant tested...

If you're producing reclaim, it will pay you to investigate RR-10, Du Pont's new reclaiming agent. After extensive experimentation and plant trials, many companies have found it to be the most effective agent ever tried for reclaiming rubber, GR-S, and mixtures of these elastomers. They report that RR-10 produces smooth reclaims with good tack . . . that it does the work quickly and economically. One user states, "RR-10 is the most powerful reclaiming agent we have ever tried."

The use of RR-10 results in higher-quality reclaim because less reclaiming oils are necessary. It can be used in either the pan or neutral (zinc chloride) process. And unlike most other chemical reclaiming agents, it is also effective in the alkali process.

Samples of Du Pont RR-10 are available. For complete information, contact our nearest branch office. E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division, Wilmington 98, Delaware.

BRANCH OFFICES:

Akron, Ohio	40 E. Buchtel Ave.	HEmlock 3161
Boston, Mass.	140 Federal St.	HAncock 1711
Chicago, Ill.	7 S. Dearborn St.	ANdover 3-7000
Los Angeles, Cal.	845 E. 60th St.	ADams 3-5206
New York, N. Y.	40 Worth St.	COrtlandt 7-3966

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

DU PONT

BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

INDIA RUBBER WORLD, March, 1951, Vol. 123, No. 6. Published Monthly by BILL BROTHERS PUBLISHING CORP., Office of Publication, Orange, Conn., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Orange, Conn., under the act of March 3, 1879. Subscription United States and Mexico, $3.00 per year; Canada $4.00; All other countries $5.00; Single Copies 35 Cents. Address Mail to New York Office.

News about

B. F. Goodrich Chemical Company ***raw materials***

for improved, lower-cost rubber compounding—use

Good-rite
*REG. U. S. PAT. OFF.
RESIN 50

WITH this easy-processing reinforcing agent, you can make important savings on your rubber-compounding costs. Finished products will be improved, too.

Just see what Good-rite Resin 50 does! It provides a new compounding approach to hardness problems. For example, it's a simple means of filling in the gap between soft rubber compounds and ebonites.

It saves time by eliminating master-batching. It gives rubber compounds better flex life, higher elongation, improved abrasion resistance. Compounds are more easily handled because Resin 50 acts as a plasticizer at processing temperatures.

For extruded shapes such as gaskets, tubing, coving, etc., particularly on hard compounds, Resin 50 provides improved surface smoothness and superior processing characteristics in the extruder.

Made as a white, free-flowing powder, Good-rite Resin 50 can be compounded in a wide range of colors. It may help you improve your rubber compounding, save you money, too. Under present conditions, demand for Good-rite Resin 50 exceeds supply. However, limited quantities are available for development work. For technical bulletins and advice, write Dept. CB-2, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
Reg. U. S. Pat. Off.
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

Philblack* A *with* Philblack* O

Keeps mileage high but tire costs low!

If you're wondering which end is up these days, let both Philblack A and Philblack O come to your rescue. Mixed together, these two blacks team up to make possible the production of quality tires at moderate cost.

Premium Philblack O and lower cost Philblack A, blended in a two to one ratio, will produce tire treads with wear and flex resistant properties equal or superior to channel black stocks and at lower cost.

In brief, mixtures of Philblack O and Philblack A provide you with desirable processing properties and long service life for your product at an attractive price.

Dense, firm Philblack O and Philblack A pellets handle efficiently in hopper cars and most bulk conveyor systems. Bagged Philblacks also available.

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

EVANS BUILDING · AKRON 8, OHIO

Philblack A and Philblack O are manufactured at Borger, Texas.

Warehouses in Akron, Boston, Chicago and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

Phillips 66

*A Trademark

Announcement...

Naugatuck Chemical is now producing and distributing

PARACRIL

An Acrylonitrile — Butadiene Polymer . . . outstanding for its resistance to oils and gasolines

PARACRIL B
General Purpose Oil Resistant Type— Excellent Heat Resistance.

PARACRIL-BJ
Same General use as "B" but lower plasticity and easier processing.

PARACRIL-C
Maximum Oil Resistance. Excellent heat resistance and aging properties.

Price list available upon request

Process · Accelerate · Protect
with
NAUGATUCK CHEMICALS

Naugatuck Chemical DIVISION OF UNITED STATES RUBBER COMPANY
NAUGATUCK, CONNECTICUT

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company Limited, Elmira, Ontario

RUBBER CHEMICALS · AROMATICS · SYNTHETIC RUBBER · PLASTICS · AGRICULTURAL CHEMICALS · RECLAIMED RUBBER · LATICES

There are 13 reasons why SOLKA®-FLOC will improve your processing . . .

1. Reduced nerve
2. Controlled shrinkage
3. Increased hardness
4. Lighter weight
5. Less power consumption
6. Smoother surfaces
7. Lower batch temperature
8. Better plasticity
9. Less blistering
10. Controlled stiffness
11. Reduced scorching
12. Suede-like finishes
13. Uniform blowing in sponge

One or more are sure to better your product, increase your profits. Discover what Solka-Floc can do. Send your processing problems to our Technical Service Department for recommendations and samples.

A PRODUCT OF QUALITY BROWN *Company*

Berlin, NEW HAMPSHIRE

GENERAL SALES OFFICES: 500 FIFTH AVENUE, NEW YORK 18, N. Y.

Branch Sales Offices: Portland, Me., Boston, Chicago, St. Louis, San Francisco, Montreal

SOLKA & CELLATE PULPS • SOLKA-FLOC • NIBROC PAPERS • NIBROC TOWELS • NIBROC KOWTOWLS • BERMICO SEWER PIPE, CONDUIT & CORES • ONCO INSOLES • CHEMICALS

Save 10%

in resin and resin costs by

reinforcing with Pliolite S-6B

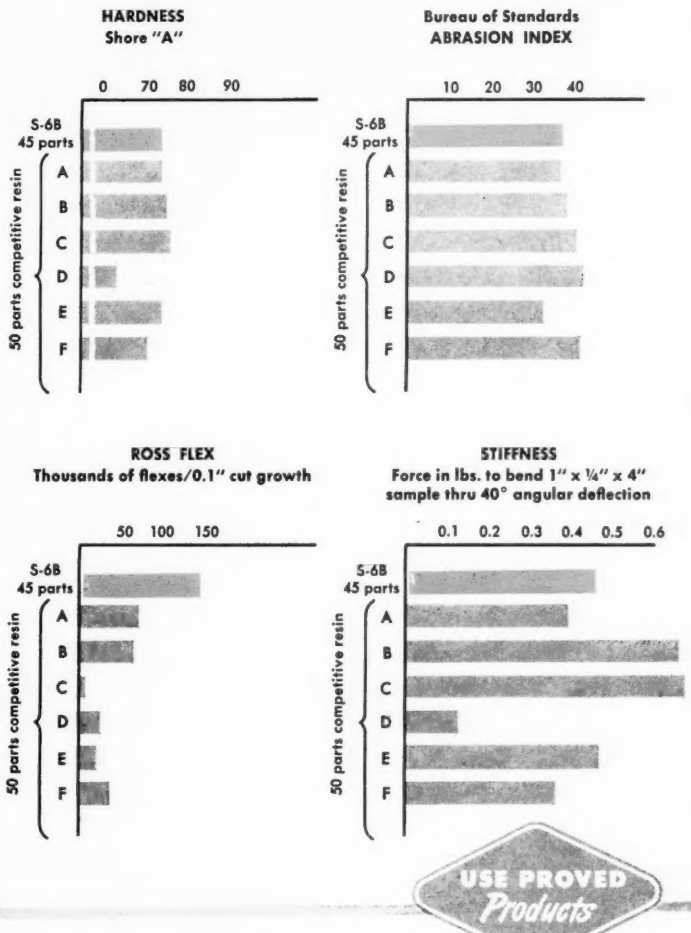
FOR all practical purposes, you can equal the results you get with comparable resins—*using 10% less* PLIOLITE S-6B. The charts here show you actual test comparisons between Goodyear's use-proved reinforcing resin and competitive materials used in shoe sole stocks. But there's one important difference — 10% less PLIOLITE was used to achieve the results shown.

You should make other savings, too, because PLIOLITE S-6B is readily processable, with superior dispersion characteristics, improved flow and minimum shrinkage.

If you're not already using PLIOLITE S-6B in a 45-parts-per-100-parts-of-rubber formulation in shoe sole stocks, it will pay you to evaluate this resin now. Write today for details and sample to:

Goodyear Chemical Division
Akron 16, Ohio

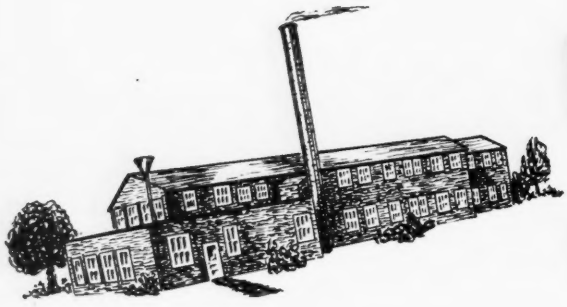
PHYSICAL PROPERTIES OF TYPICAL SHOE SOLE STOCK



GOODYEAR

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

Pliolite—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



50 Years

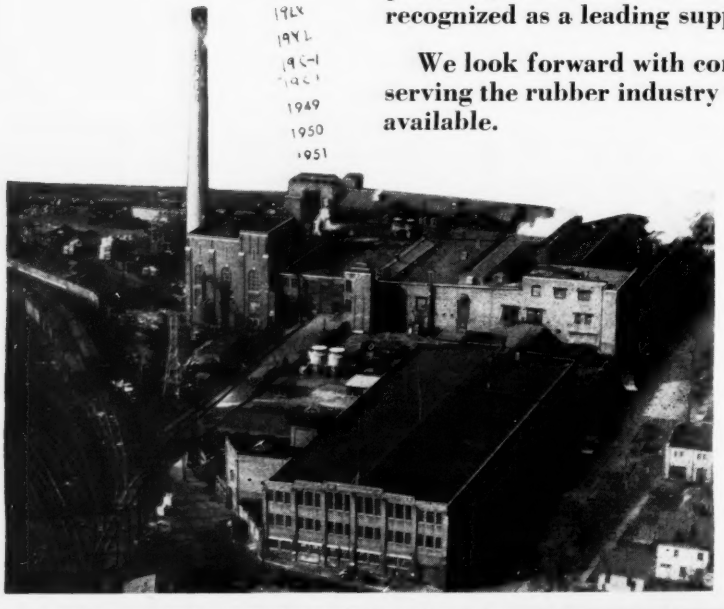
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1951

From a modest beginning in 1901 Pequanoc Rubber Company has reached the point where it celebrates, in 1951, its Fiftieth Anniversary.

Through a half century of wars and crises, depressions and inflation, through periods of low and high priced crude rubber, and faced with the new problems of reclaiming synthetic rubbers, Pequanoc has met each challenge in its constant effort to give its customers better reclaimed rubber.

Today with a modern plant, with this reservoir of experience, and with a well trained personnel, Pequanoc is recognized as a leading supplier of quality reclaims.

We look forward with confidence to our next fifty years serving the rubber industry with the best reclaimed rubber available.



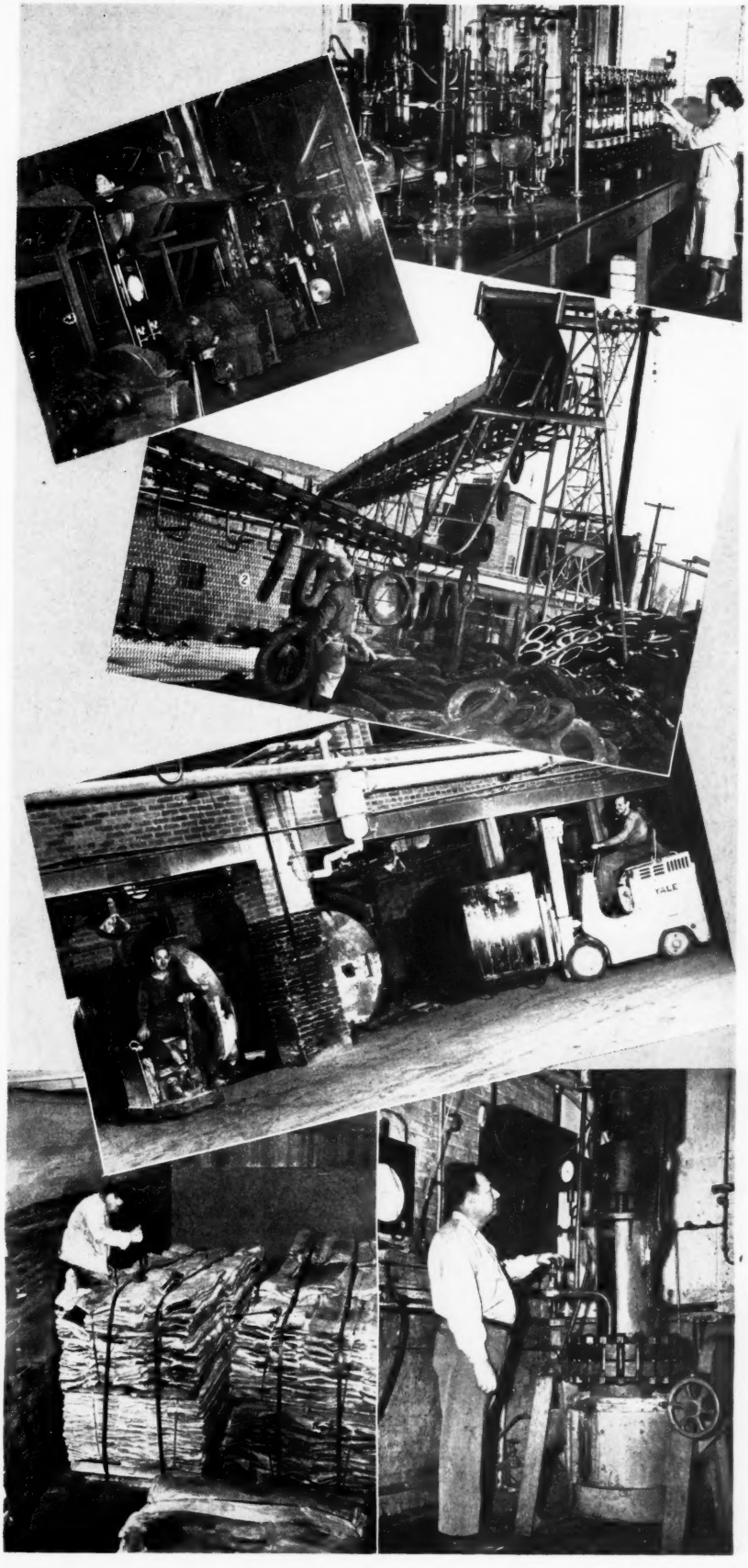
Aerial view of
Pequanoc Rubber Company plant
at Butler, New Jersey

PEQUANOC RUBBER CO.

QUALITY RECLAIMS FOR SPECIFIC PURPOSES

BUTLER, NEW JERSEY

OF RUBBER RECLAIMING EXPERIENCE— DEVELOPMENT— SERVICE



1. 2500 boiler hp is generated in this modern power plant to provide processing steam for the various reclaiming operations. In addition electric power is obtained outside.

2. Corner of chemical laboratory showing technician running extractions and rubber hydrocarbon analyses.

3. This hook conveyor maintains a continuous flow of scrap tires from the railroad siding into the plant where the tires start their journey through the Pequanoc reclaiming process.

4. Part of a battery of high pressure devulcanizers being loaded by electric trucks.

5. Finished reclaim being strapped on pallets in freight car for easy handling by lift trucks at customer's plant.

6. Operating experimental high pressure devulcanizer in pilot plant.

SUBLAC

non-scorching RESIN

a synonym for saving

SUBLAC Resin B-2-A, a white powder, is the lowest priced, non-scorching reinforcing resin available today!

SUBLAC Resin is outstanding in its ability to impart desirable characteristics to rubber compounds. For example, it may be used to obtain any of these properties: Hardness, Stiffness, Abrasion Resistance, Tear Resistance, Oil Resistance. In many cases, the use of **SUBLAC** Resin alone is sufficient to obtain a combination of several of these properties and at the same time provide a compound with easy processing characteristics and a high general order of physicals. *In addition*, **SUBLAC** Resin is *non-scorching!*

SUBLAC Resin B-2-A is especially advantageous in stocks highly loaded with clay, whiting, or Silene. The following compounds are representative of such highly loaded, easy processing stocks that require no 'trick' mixing techniques:

Experimental Slab Stock		Experimental Tile Stock	
GR-S 521	100	GR-S 521	100
SUBLAC Resin B-2-A	30	SUBLAC Resin B-2-A	30
Circo Light	35	Circo Light	15
ZnO	5	ZnO	5
DPG	.15	DPG	.5
Altax	2.13	Altax	2.13
Hard Clay	300	Hard Clay	200
Sulfur	3.70	Whiting	150
		Sulfur	8

Cure 10′ @ 320° F

Tensile	950		
Elongation	450%		
Shore Hardness (A Scale)	97-98	Shore Hardness (D Scale)	60-61

In these compounds, the **SUBLAC** Resin was added to the rubber, then enough clay to take up all of the oil, followed by the remainder of the ingredients in the usual manner.

SUBLAC Resin B-2-A is readily available. ***Send for your sample today!***

Prices | 29½c lb. in truck loads
30c lb. in lesser quantities
fob factory in fiber drums

THE POLYMEL CORP.

1800 Bayard Street
Baltimore 30, Maryland
Phone: PLaza 1240

MILLIONS

...of miniature factories...

United channel blacks are remarkable products wrested from hydrocarbon gases in miniature flames that are starved for air.

United channel blacks stem from over four million precisely regimented flame factories where each particle of black is refined in incandescent heat.

United channel blacks are collected by impingement in the nascent state and they retain their innate activity in support of high reinforcement of rubber.

United channel blacks have been in use for decades and have an enviable record of satisfactory performance. They are uniform, dependable, and ever in demand.

Think of channel black—United channel black—for durable rubber products.

UNITED CARBON COMPANY, INC.

CHARLESTON 27, WEST VIRGINIA

NEW YORK · AKRON · CHICAGO · BOSTON

UNITED CHANNEL BLACKS

KOSMOBILE 77 (EPC)
KOSMOBILE HM (MPC)

Think of channel black . . .

United channel black . . .

for durable rubber products.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

CHARLESTON 27, WEST VIRGINIA

FARREL-BIRMINGHAM EXTRUDERS

for specialized production

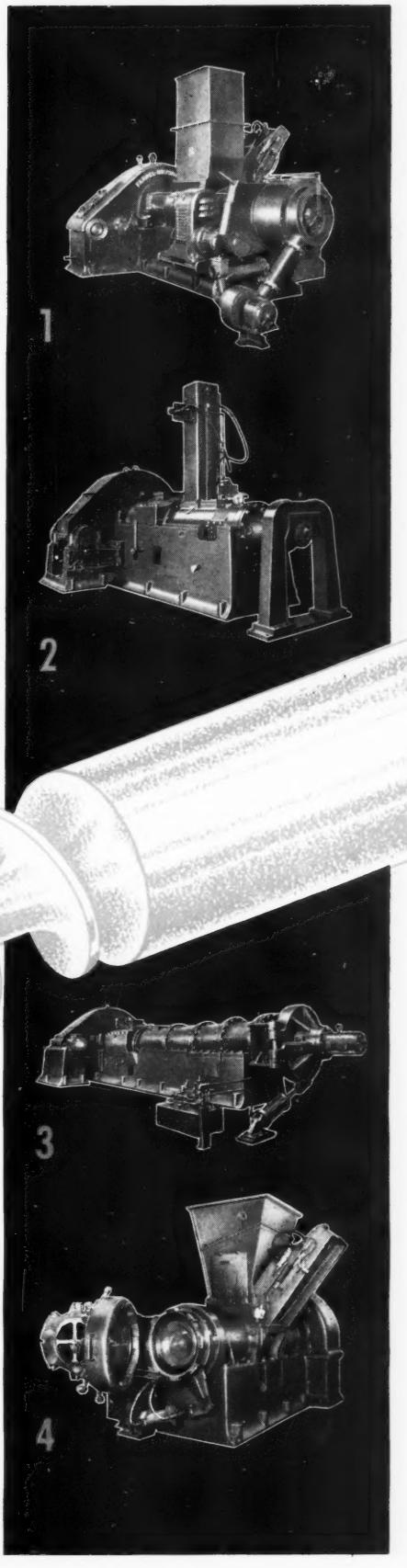
Farrel-Birmingham Extruders are designed to meet individual requirements for special extruding jobs. Take these four machines, for example.

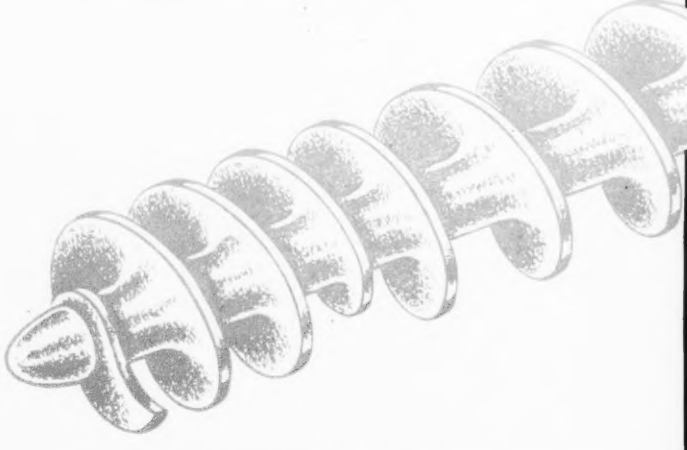
1. **HALE PELLETIZER**—Produces free-flowing rubber pellets which provide more efficient and economical handling and storage, quicker processing and more uniform quality.

2. **GORDON PLASTICATOR**—Specially designed for breaking down rubber. Improved plasticity and high productive capacity at low cost characterize its performance.

3. **20-INCH EXTRUDER**—This giant machine is the largest extruder ever built for working plastics. Over 30 feet in length, its 20-inch diameter screw is 17 feet long.

4. **COMBINATION STRAINER-EXTRUDER**—Takes entire batch from a Banbury Mixer, strains it and extrudes it in a tube, split to form a strip. Other extruded shapes may be obtained by changing the head section.





If you have an extrusion problem, why not call in a Farrel-Birmingham engineer for consultation?

FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

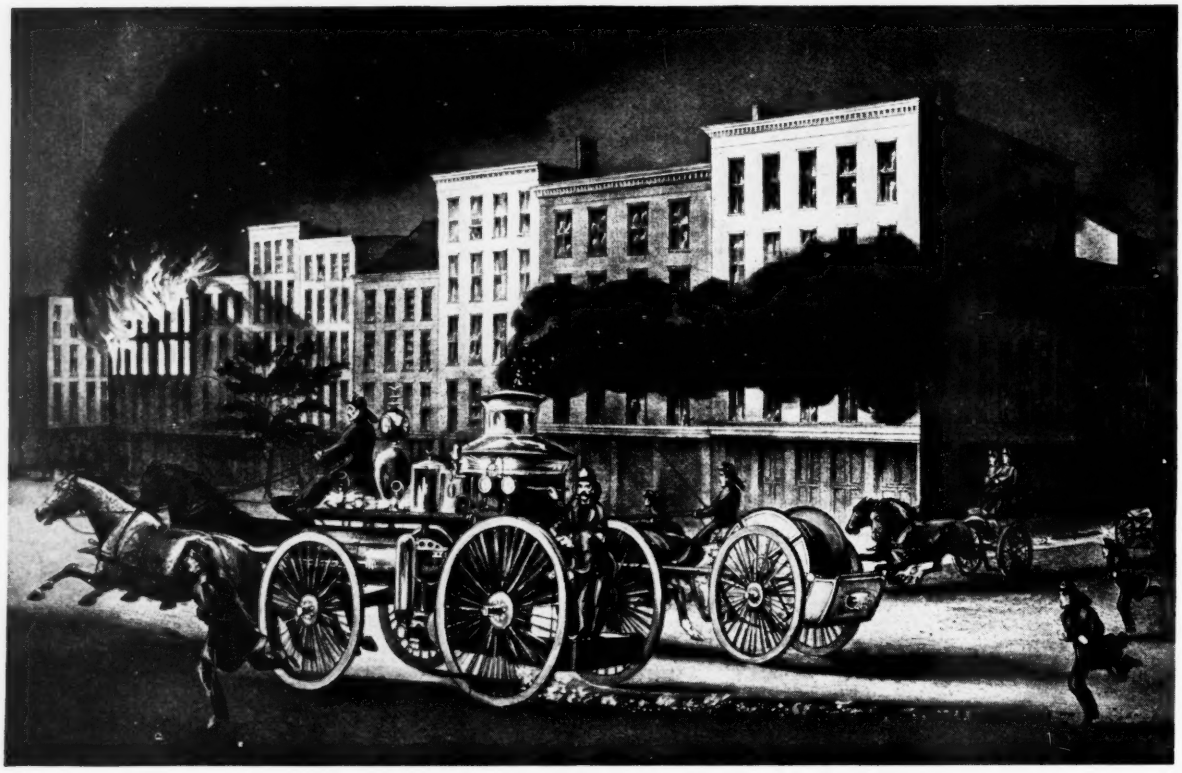
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

Farrel-Birmingham®

FB-652

PIONEERS OF THE CENTURY

(FIFTH OF A SERIES)



1882...FIRE ENGINES *Answer* THE CALL

When clanging, smoking, fire engines dramatically replaced man-drawn hand-pumpers, the work of firemen became easier and much more effective. But firefighters were not the only ones to feel the influence of engines in the 1880's. The output of workers in many fields was being multiplied many fold by the growing power of machines. The industrial age of America was at hand, bringing lighter tasks, more leisure and finer living.

The young rubber industry quickened its pace to answer the call of home and industry for more and better products. Many of those products contained high percentages of Zinc Oxide for improved physical properties, as evidenced by this well-known compound for insulating wires and cables.

To meet the expanding demand for Zinc Oxide from its two principal consuming fields—rubber and paint—The New Jersey Zinc Company in 1882 pioneered the development of Leaded Zinc Oxide for the paint industry. Its early adoption made more Horse Head lead-free Zinc Oxide available for the needs of the rubber industry.

WIRE INSULATION

India rubber	49.6%
Litharge	26.3
Zinc Oxide	15.5
Sulfur	5.3
Lampblack	3.2
Silica	0.1
	100.0%

For over a century, The New Jersey Zinc Co. has continued to pioneer outstanding developments, many of which have helped speed the progress of the rubber industry.

HORSE HEAD ZINC PIGMENTS

The Pioneer Line

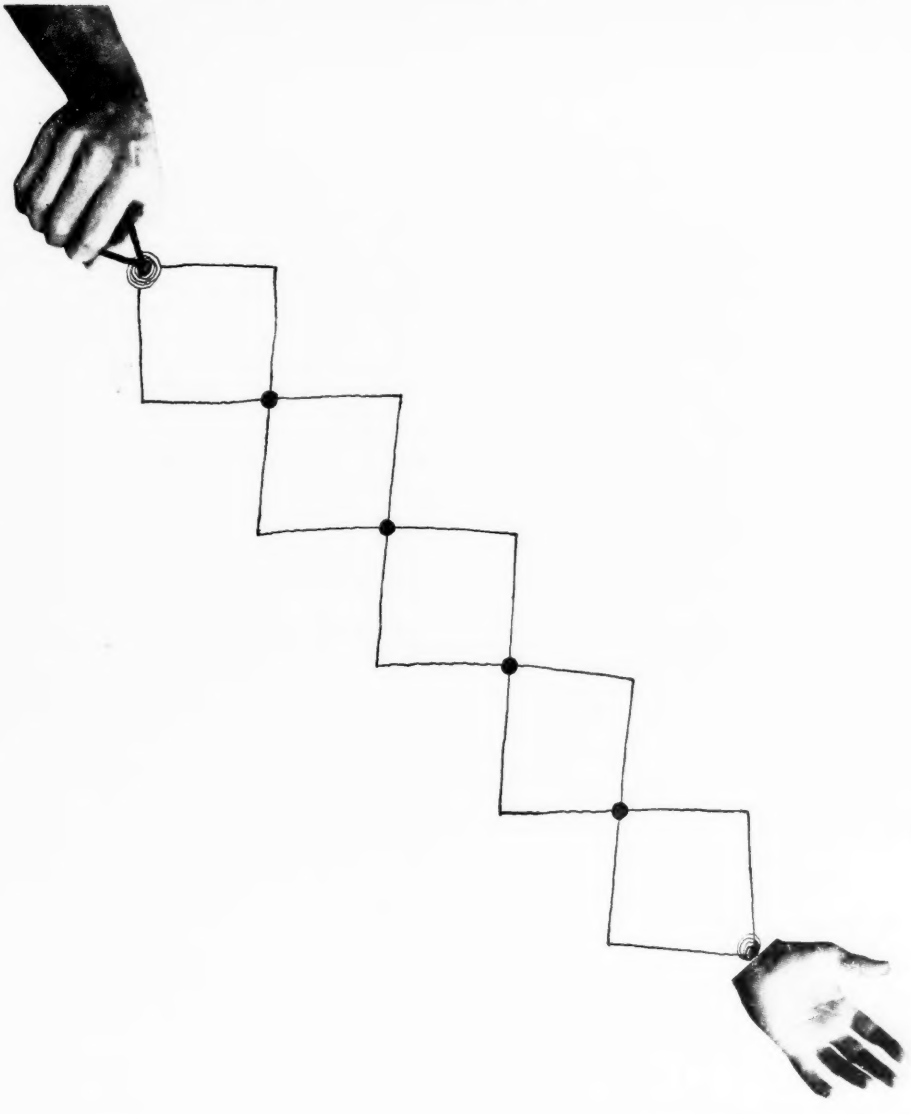
Most used by the rubber industry since 1852

THE NEW JERSEY ZINC COMPANY

Founded 1848

160 Front Street, New York 7, N. Y.

HORSE HEAD PRODUCTS



you can extend
your crude up to 30%
with Purecal!

Crude rubber is critical and costly. That's why it makes sense to stretch it with Purecal*. Purecal U will extend your crude rubber up to 30% ... will improve tear resistance ... will lower costs over 14% (with no loss in tensile strength or hardness).

Sound good? Purecal is good! Purecal M is the only calcium carbonate pure enough to add to synthetic or natural lattices without thickening or gelling. If you'd like to know more write for our booklet, "Purecal in Natural Rubber."

*Trademark

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE
HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE
DICHLORIDE • AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

WYANDOTTE CHEMICALS CORPORATION
Wyandotte, Michigan • *Offices in Principal Cities*

Wyandotte
REG. U. S. PAT. OFF.

PHOTOGRAPH: UNITED AIR LINES

"Up in the Air" About Solvents?

Skellysolve for Rubber and Related Industries

Applications

SKELLYSOLVE B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound.

SKELLYSOLVE C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve B.

SKELLYSOLVE D. For cements and variety of manufacturing operations. Good odor. Quick drying. Minimum of heavy, greasy compounds.

SKELLYSOLVE H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve D is desired.

SKELLYSOLVE E. For use wherever a relatively slow drying solvent is desired.

SKELLYSOLVE R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency.

"DOC" MacGEE SAYS: You benefit in many ways when your solvent problems are dissolved with Skellysolve! Strict laboratory controls mean that every batch of Skellysolve is the same. You get *uniformity* that protects your product's quality and helps your salesmen to get new business as well as to hold old customers.

No bloated containers because of high vapor pressure—no blisters in tires or shoes due to blushing or high boiling compounds. No seeds in cements due to low boiling compounds. And high bonding strength because of freedom from greasy residues.

From various standpoints, you're better off with Skellysolve. It is less toxic than some other solvents, therefore reduces health hazards. It is sweet-smelling, pleasant to work with—and it won't freeze at atmospheric temperature.

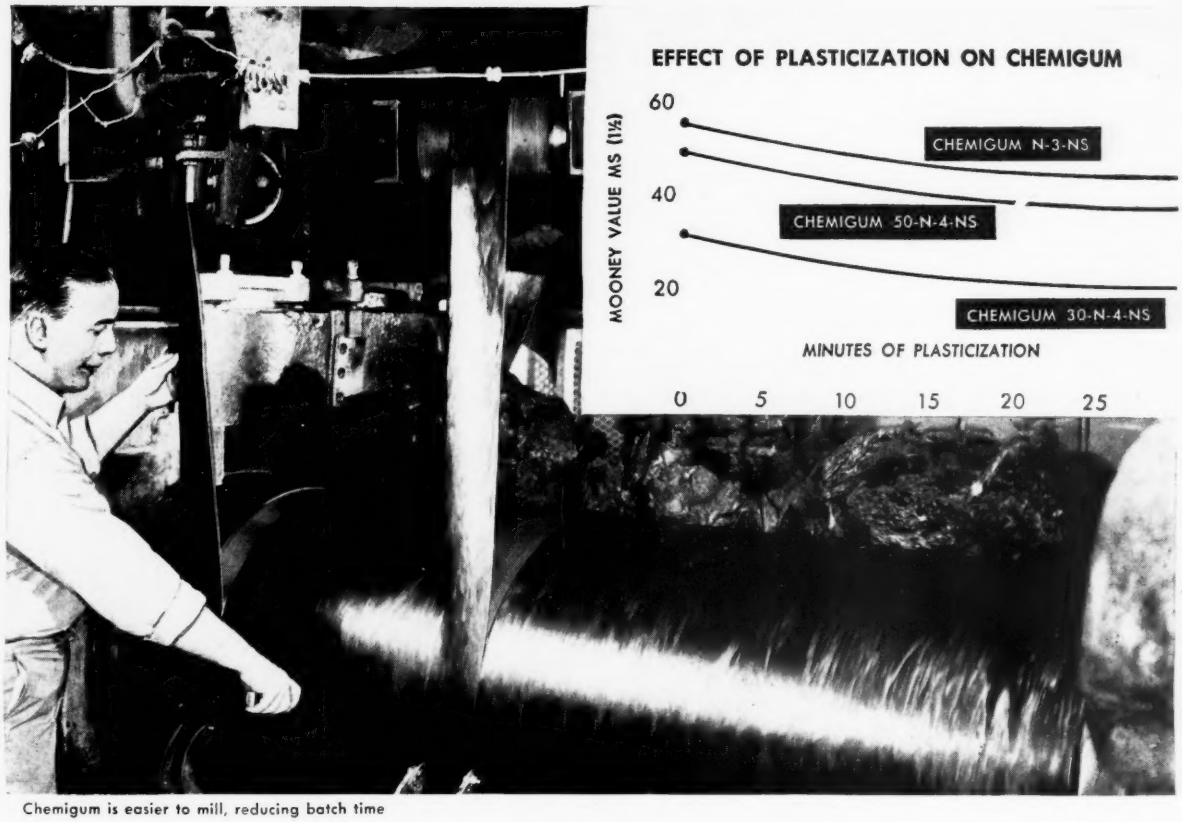
Check Skellysolve from every angle —low end points, quick evaporation, low vapor pressure, minimum of unsaturates and pyrogenic decomposition products — just the characteristics you look for.

Get complete technical facts. Write today for full information on Skellysolve!

SKELLY

Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY
KANSAS CITY, MISSOURI



Chemigum is easier to mill, reducing batch time

For easier processing compounds

Use CHEMIGUM

CHEMIGUM oil resistant rubbers give you outstanding processing characteristics. These Goodyear synthetics *do not toughen or harden* with prolonged heat and mastication on a mill or in a Banbury. *They actually tend to soften in processing* — need no special compounding techniques.

In addition to this ease of processing, the **Chemigum** rubbers have all of these unique properties:

EXCELLENT OIL RESISTANCE
LOW SWELL IN AROMATIC SOLVENTS
GOOD PHYSICAL PROPERTIES

They are well stabilized against effects of light and age with non-staining anti-oxidants which permit their use in light-colored stocks.

Chemigum N-3-NS has higher acrylonitrile content, giving it excellent oil resistance and ready processability. **Chemigum 30-N-4-NS** is a softer rubber ideally suited for extrusion, and **Chemigum 50-N-4-NS** is a tougher rubber recommended for molded products. All three forms of **Chemigum** are compatible with vinyl resins and can be used to replace and extend scarce plasticizers. For details, write Goodyear, Chemical Division, Akron 16, Ohio.

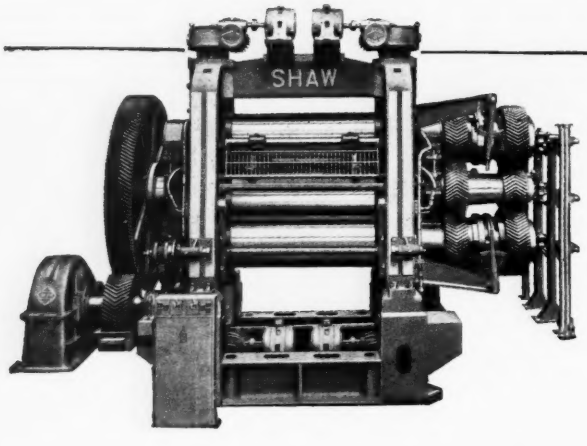
We think you'll like "The Greatest Story Ever Told" — Every Sunday — ABC Network

USE PROVED Products

GOODYEAR

Chemigum—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

✣ KEEP IN STEP WITH THE TIMES



SHAW

In an industry as progressive as that of rubber manufacture, the engineer is constantly asked to accomplish the unknown, if not the 'impossible'. That is where SHAW experience of the whole field of rubber and plastics machinery comes in —with so many steps behind us, the next forward step comes readily to our enterprise.

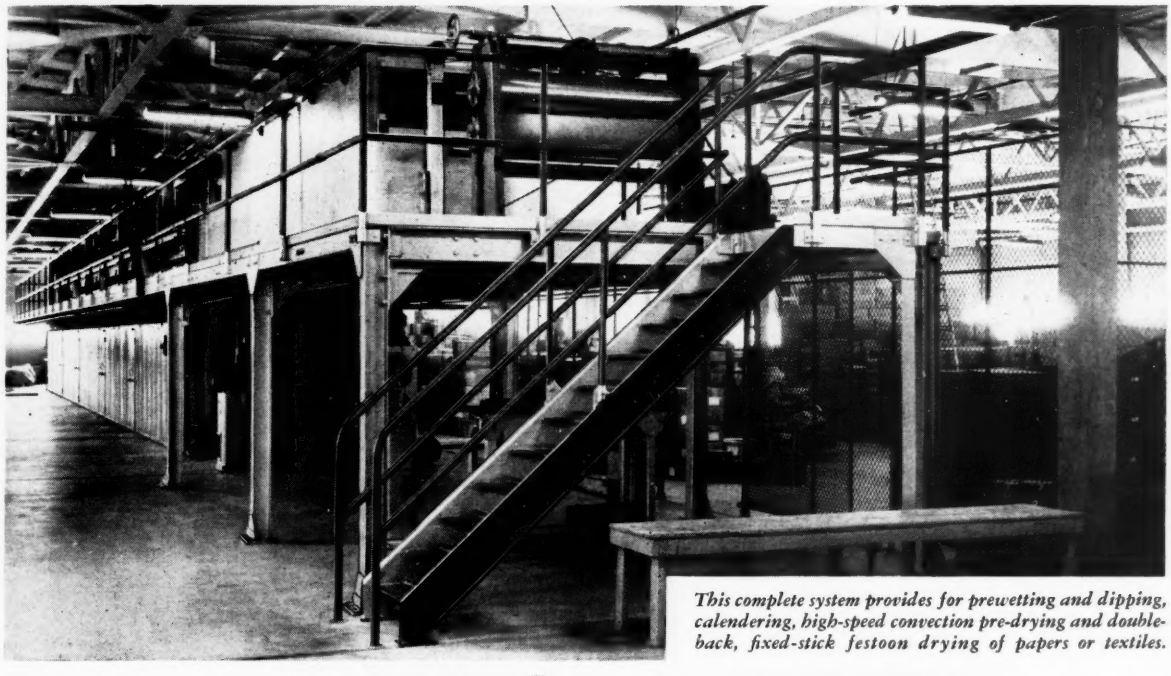
A Three-roll Calender with four-motor individually power operated roll adjusting gear, push button controlled, hydraulic jacks fitted to maintain constant pressure on top roll bearings and adjusting gear.

Flood lubrication to roll bearings for high temperature work and reduction of maintenance.

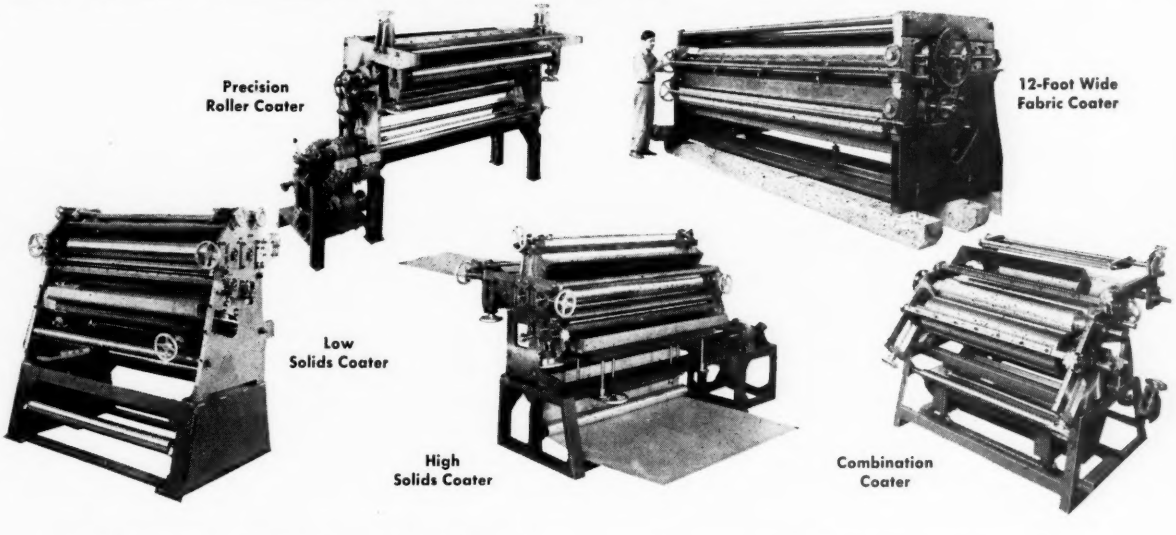
FRANCIS SHAW & COMPANY LIMITED • MANCHESTER II • ENGLAND

R. 199

IOI Equipment for Coating Fabrics, Films and Foils with Organosols, Plastisols and Hydrosols



This complete system provides for prewetting and dipping, calendering, high-speed convection pre-drying and double-back, fixed-stick festoon drying of papers or textiles.



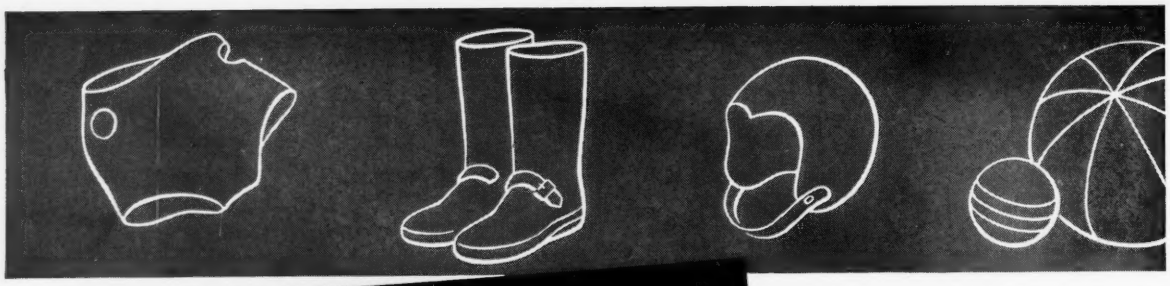
THE COATING SYSTEM and individual units shown here represent but a few examples of IOI's wide range of equipment for coating, combining and handling textiles, papers, films and foils. In addition IOI designs and manufactures letoffs, pull rolls, drying machines, system drives, etc., to augment existing equipment.

For complete information write for: "Blueprint for Industry Part V, Coating and Handling Equipment for Textiles, Papers, Films and Foils" and "The Handling of Webs and Monofilaments."

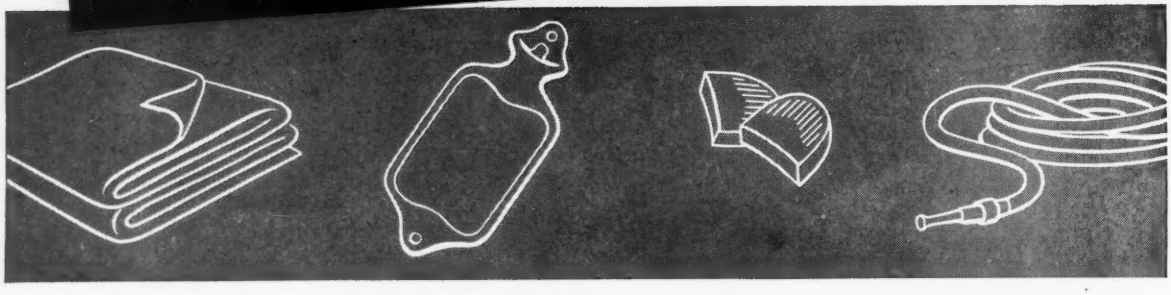
INDUSTRIAL OVENS, INC.

IOI ENGINEERING VERSATILITY

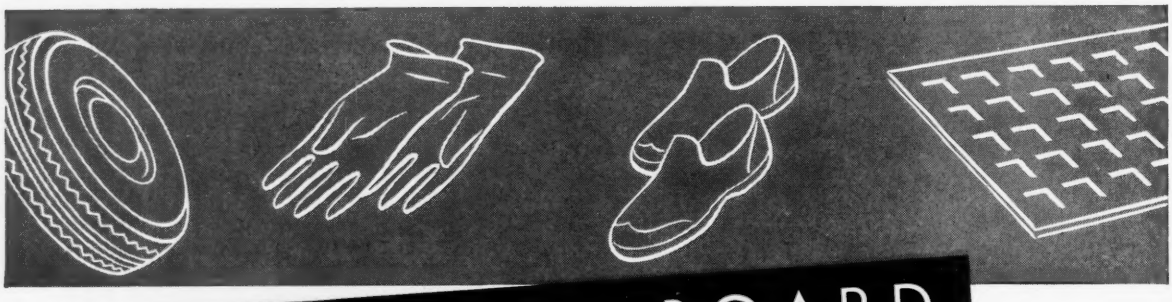
13825 TRISKETT ROAD CLEVELAND 11, OHIO



TITANOX *means*



whiter...brighter rubber products



ACROSS THE BOARD

The pure titanium dioxide pigments, TITANOX-A and TITANOX-RA assure whiter whites and brighter color tints with minimum loadings, thus maintaining the desirable characteristics of your product. TITANOX-RA-NC is advantageous in compounds which are exposed to sunlight and the weather. TITANOX-RCHT (rutile-calcium pigment) is preferred for economical whiteness and brightness in more heavily loaded stocks. Its finely divided pigment and extender promote normal aging and resist discoloration.

Our Technical Service Department is ready at any time to discuss your individual rubber pigmentation problems with you. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments, Ltd., Montreal 2; Toronto 1.

8970

® **TITANOX**

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

Must your fatty acids *always* meet these specifications?

→ **RELIABILITY**

→ **UNIFORMITY**

→ **CONTINUOUS SUPPLY**

→ **FAIR PRICES**

Then Always Specify EMERY Fatty Acids

Emery's 110 years of fatty acid experience is your assurance of absolute uniformity and precise adherence to your demands shipment after shipment. You can look to Emery's continuing research and development of processing methods to bring you the *finest* in fatty acids *first*.

Choose from a complete selection of high quality, high stability Stearic and Oleic Acids, Vegetable Fatty Acids, Hydrogenated Animal and Fish Fatty Acids and Glycerides—Emery has every type and quality you can ask for to meet exact specifications and price needs.

Branch Offices

3002 Woolworth Bldg., New York 7, N.Y.

187 Perry St., Lowell, Mass.

401 N. Broad St., Philadelphia 8, Pa.

420 Market St., San Francisco 11 Calif.

Warehouse stocks also in St. Louis, Buffalo and Baltimore

EMERY INDUSTRIES, INC.

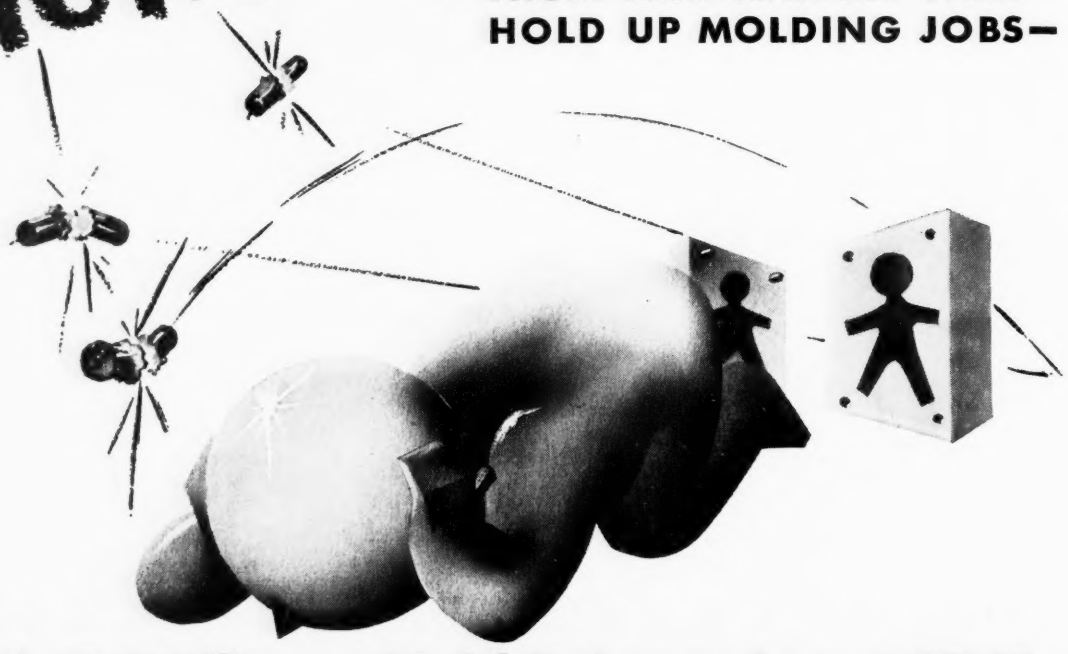
Carew Tower, Cincinnati 2, Ohio

Export Dept.: 5035 R.C.A. Bldg., New York 20, New York

THE WORLD'S LEADING PRODUCER OF FATTY ACIDS

Holiday

FROM HINDRANCES THAT HOLD UP MOLDING JOBS—

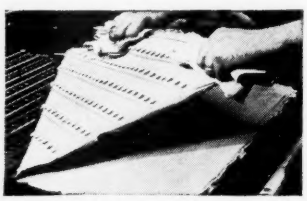


with G-E Silicone Mold Release Agent 81161

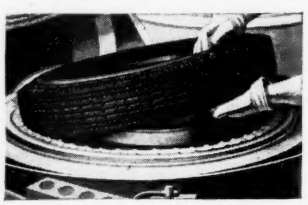
Look to G-E 81161 for clearing away the obstacles to efficient rubber molding. This matchless mold release agent, compared with conventional mold lubricants, cuts down rejects as much as 25% . . . reduces mold down time for cleaning . . . gives more *even* release. Many of the largest rubber companies have used G-E 81161 on the job—their experience has *proved* these significant advantages . . .

- **Excellent Mold Coverage**—G-E 81161 gives outstanding performance on intricate molds.
- **Stability at Higher Temperatures**—G-E 81161 remains stable at temperatures up to 150 F.
- **Stability under Mechanical Working**—G-E 81161 won't break or cream under *repeated* recycling in centrifugal pumping systems.
- **Hard Water Stability**—G-E 81161 will remain stable 24 hours at 750 PPM at ½% dilution.
- **Many Other Advantages**—G-E 81161 will not stain light-colored stocks, is rust-inhibited, has low toxicity, and gives outstanding performance in numerous other ways.

These advantages are *facts*—established by laboratory tests and practical use by the largest rubber companies. We invite you to make these advantages yours. Write for details to Section P-1, Chemical Department, General Electric Company, Pittsfield, Mass. (In Canada: Canadian General Electric Co., Ltd., Toronto.)



Smoother finished rubber buttons are obtained through the even release provided by G-E 81161.



Tires are easily released untorn, unscratched—thanks to G-E 81161, which prevents pocketing.

Silicones for Industry

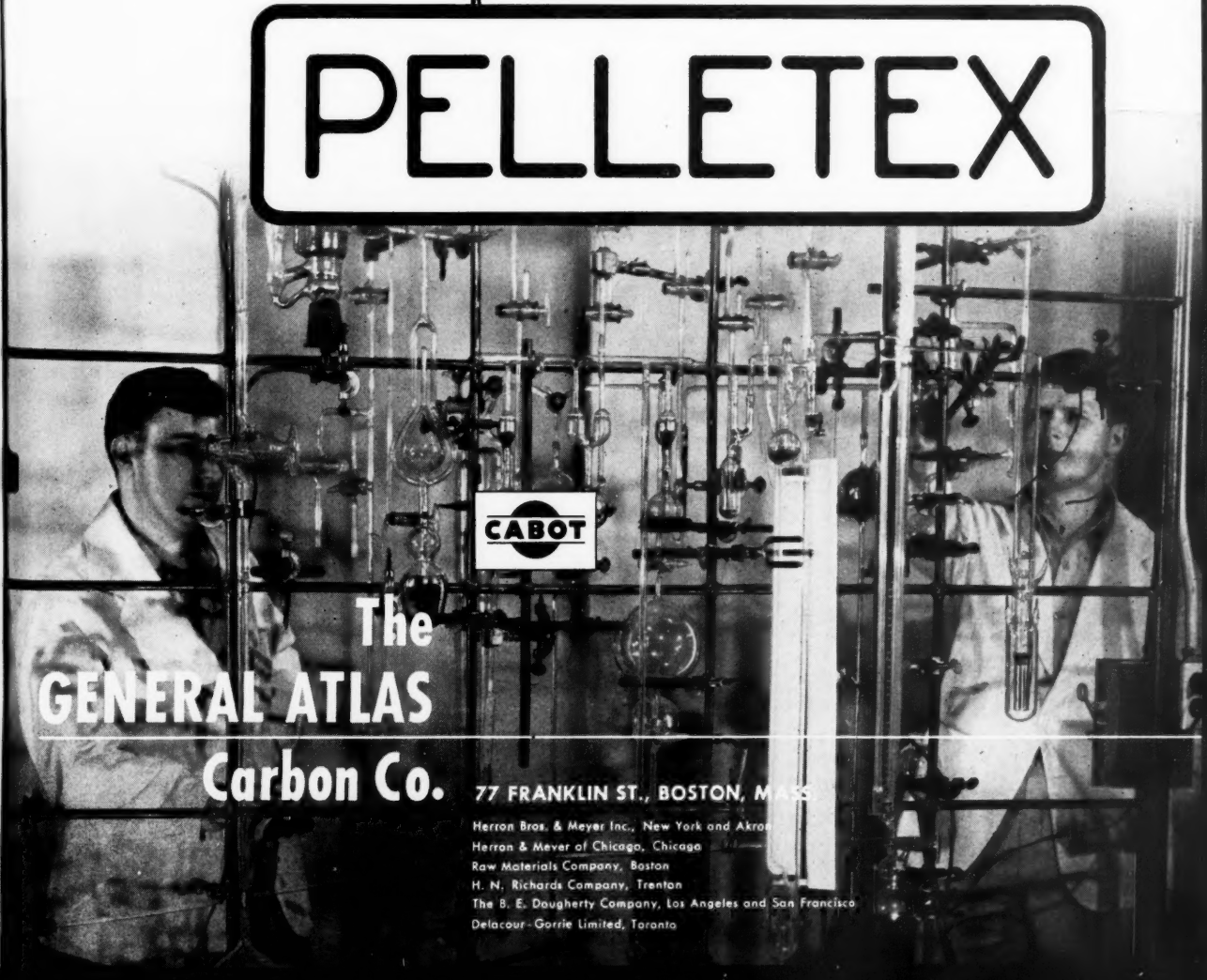
GENERAL ELECTRIC

When it's PELLETEX you KNOW...

It's the BEST

A visit to a PELLETEX plant shows the latest and best refinements of process and equipment. Every step from gas to black is under scientific control. Trained engineers keep those controls keyed to perfection. Laboratory men, production men, maintenance crews, shippers and packers — all experts in their fields — work harmoniously to bring you the best in SRF carbon black — PELLETEX.

Efficiency at the plant is reflected in the uniform high quality of PELLETEX, the ideal semi-reinforcing carbon pigment for the rubber manufacturer.



The GENERAL ATLAS Carbon Co. 77 FRANKLIN ST., BOSTON, MASS.

Herron Bros. & Meyer Inc., New York and Akron
Herron & Meyer of Chicago, Chicago
Raw Materials Company, Boston
H. N. Richards Company, Trenton
The B. E. Dougherty Company, Los Angeles and San Francisco
Delacour-Gorrie Limited, Toronto

magic ?

There is no "Magic" in obtaining Adhesion with TY-PLY

Clean Metal. Apply one coat of TY-PLY by brushing, spraying or dipping. Vulcanize the rubber stock to the TY-PLY coated metals.

For your convenience Marbon maintains an adhesive service laboratory at Gary. Our representatives will be glad to discuss rubber to metal applications with you.

FOR SERVICE CALL:

R. P. Painter
20 Pleasant Street
Natick, Massachusetts
Tel. No. Natick 3239W

R. E. Smith
4 Bruce Lane
Trenton, New Jersey
Tel. No. 5-4659

R. B. Sucher
94 Center Street North
Seville, Ohio
Tel. No. 3135

M. E. Jones
1926 West 10th Avenue
Gary, Indiana
Tel. No. 9146

Harwick Standard Chemical Co.
1248 Wholesale Street
Los Angeles 21, California
(West Coast)

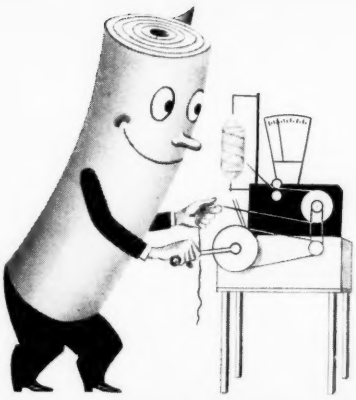
Dillons Chemical Company, Ltd.
410 St. Nicholas Street
Montreal 1, Canada
137 Wellington Street
Toronto 1, Canada

Anchor Chemical Company, Ltd.
Clayton Lane, Clayton
Manchester, England

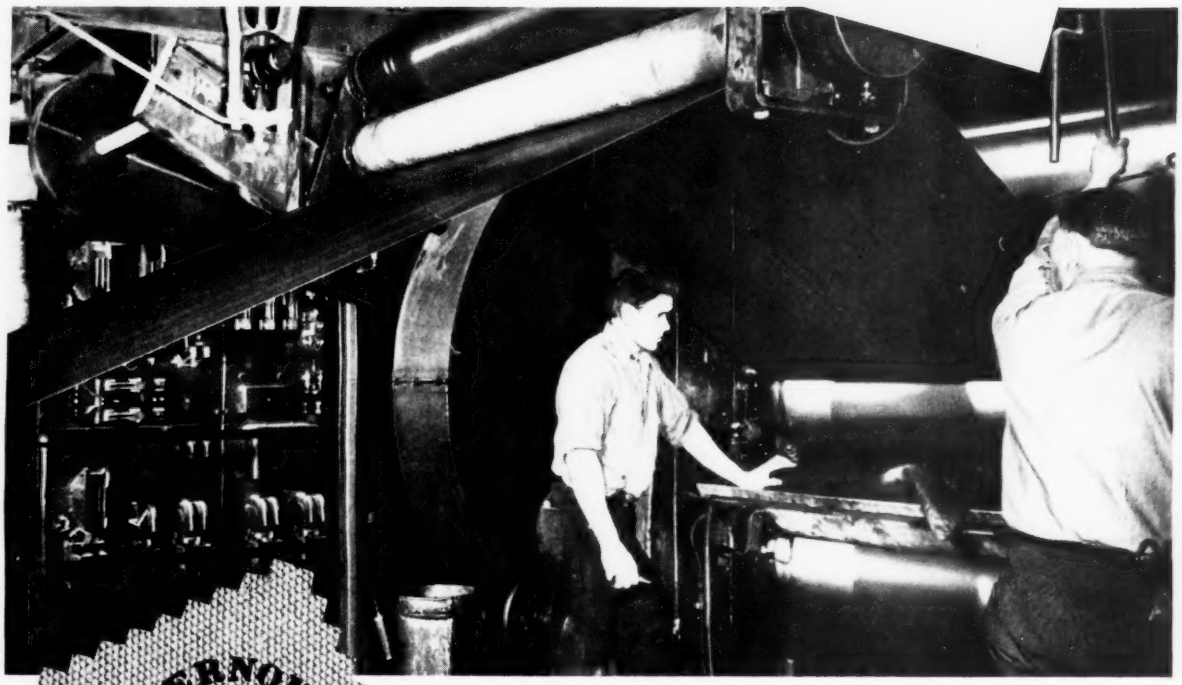
British Anchor Chemical Corporation
11 West 42nd Street
New York 18, New York
(All export except Canada)

TY-PLY Has Stood the Test of Time Since Thirty-Nine

MARBON CORP.
GARY INDIANA



UNIFORMITY
Makes the Big Difference in INDUSTRIAL Fabrics



MT. VERNON FABRICS

Give You Greater Fabric Uniformity

The greater uniformity of Mt. Vernon fabrics means *consistent* quality in your finished products — smoother, more efficient fabrication.

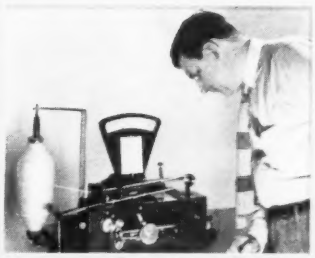
AT YOUR SERVICE

Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

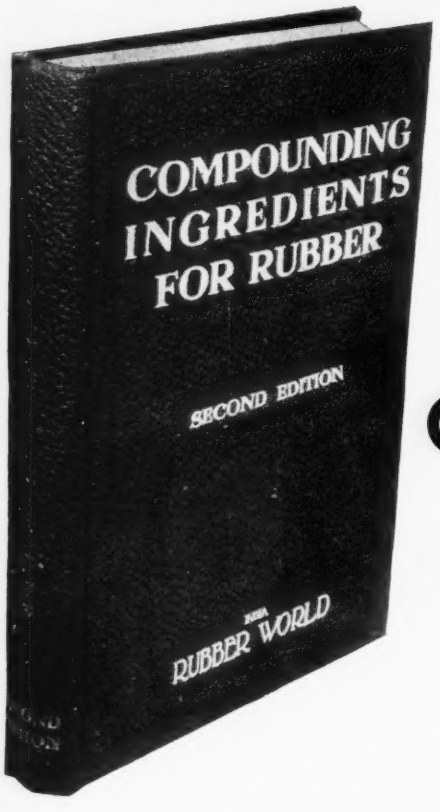
Mt. Vernon - Woodberry Mills

TURNER HALSEY
COMPANY
Selling Agents
40 WORTH ST. · NEW YORK

Branch Offices: Chicago • Atlanta • Baltimore
Boston • Los Angeles • Akron



CHECKING COEFFICIENT OF VARIATION And Average Factor Of Quality On Evenness In Roving With Belger Tester. One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.



A MUST

FOR EVERY COMPOUNDER

1947 — Second Edition of

COMPOUNDING INGREDIENTS for RUBBER

The new book presents information on nearly 2,000 separate products as compared to less than 500 in the first edition, with regard to their composition, properties, functions, and suppliers, as used in the present-day compounding of natural and synthetic rubbers. There is also included similar information on natural, synthetic, and reclaimed rubbers as the essential basic raw materials. The book consists of over 600 pages, cloth bound for permanence.

PLEASE FILL IN AND MAIL WITH REMITTANCE

India RUBBER WORLD 1951
386 Fourth Avenue
New York 16, N. Y.

Enclosed find $..... for which send postpaid ..... copies of the 1947 Second Edition of *"Compounding Ingredients for Rubber."*

Name .....
Firm .....
Street .....
City ..... State .....

$5.00 Postpaid in U.S.A.—$6.00 Elsewhere. Add 2% sales tax for books delivered in New York City.

Campbell SOAPSTONE DISPENSER

Don't wait—here's the best dusting equipment for the long pull ahead!

Don't wait — order now! Install one or more Campbell Model 1404-8 Soapstone Dispensers for external and internal dusting. We can still give you very good delivery. Leading rubber companies are using the Campbell Soapstoner, some as many as 25 machines, in their dusting operations.

BELOW: The Campbell Bagloader, extra equipment for the Soapstoner. Fills the dusting chamber a bagfull at a time. Saves time and labor. Insures a cleaner operation because the bag is fastened to the prongs in the box-like top while the dust drops into the chamber.

Write, wire or call

us today for a price quotation and illustrated folder

The FALLS ENGINEERING AND MACHINE CO.

1734 FRONT ST. CUYAHOGA FALLS, OHIO

Established 1917

Sleeping Beauty...

brought to Life

by STANLEY VINYL PLASTISOL

Leading doll manufacturers everywhere are making make-believe more exciting to a new generation of little home-makers, thanks to vinyl plastisols created by Stanley chemists especially for slush molding doll parts. These manufacturers know that Stanley plastisols produce dolls that look alive to the touch as well as the eye . . . and, more important, make sales sit up and take notice.

Stanley plastisols are also used to great advantage industrially, for many molded and dipped products where flexibility is required. Stanley plastisols can be formulated for maximum resistance to abrasion, oils, moisture, and chemicals . . . for low temperature flexibility. Find out how your product can be improved by a Stanley vinyl plastisol: write today to the Stanley Chemical Company, East Berlin, Connecticut.

STANLEY *Industrial Coatings*

STANLEY CHEMICAL

LACQUERS SYNTHETICS JAPANS ENAMELS

STAMFORD "FACTICE" VULCANIZED OIL

(Reg. U. S. Pat. Off.)

Our products are engineered to fill every need in natural and synthetic rubber compounding wherever the use of vulcanized oil is indicated.

We point with pride not only to a complete line of solid Brown, White, "Neophax" and "Amberex" grades, but also to our aqueous dispersions and hydrocarbon solutions of "Factice" for use in their appropriate compounds.

Continuing research and development in our laboratory and rigid production control has made us the leader in this field.

The services of our laboratory are at your disposal in solving your compounding problems.

THE STAMFORD RUBBER SUPPLY COMPANY

Stamford, Conn.

Oldest and Largest Manufacturers of "Factice" Brand Vulcanized Oil Since 1900

now **THIXON**

for those **TOUGH RUBBER-TO-METAL BONDING PROBLEMS**

This illustration shows a laboratory test on one of the new THIXON one-coat rubber-to-metal bonding agents.

in Applications of
Natural Rubber ✓ GRS ✓
Cold GRS ✓ Neoprene ✓
Butyl Rubbers ✓ Acrylonitrile Rubbers ✓
to BRASS, COPPER, STEEL, etc...

THIXON is the name to remember when your production problem calls for rubber-to-metal adhesion by vulcanization . . . THIXON IS THE NAME FOR A GROUP OF OUTSTANDING BONDING AGENTS developed for a broad range of applications of natural and synthetic rubbers to various types of metals . . . THIXON ADHESION BOOSTERS, ADHESION PRIMERS AND DIRECT ADHESION AGENTS are increasing the efficiency of bonding performance and REDUCING SCRAP for many manufacturers . . . Do you have a rubber-to-metal bonding problem that needs such assurance of efficiency and scrap-saving?

THIXON is distributed through Harwick Standard Chemical Company offices in Akron, Boston, Chicago and Trenton . . .

Write for technical Bulletin today!

DCP
THIXON

THIXON IS A PRODUCT OF
DAYTON CHEMICAL PRODUCTS LAB. INC.
WEST ALEXANDRIA, OHIO

HARWICK STANDARD CHEMICAL CO.
AKRON, OHIO

VULCANIZED VEGETABLE OILS

—RUBBER SUBSTITUTES—

Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.

A LONG ESTABLISHED AND PROVEN PRODUCT

THE CARTER BELL MFG. CO.
SINCE
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY

Represented by:
HARWICK STANDARD CHEMICAL CO.
Akron — Boston — Trenton — Chicago — Denver — Los Angeles

The Institution of the Rubber Industry

LONDON

"THE TRANSACTIONS I.R.I."

The following papers have been published in Vol. 26 Nos. 1-4 of the "Transactions I.R.I."

"Rubber as an Engineering Material." Symposium papers and discussions.

"Natural Rubber: Its Properties as a Raw Material for the Manufacturing Industry." A. van Rossem.

"The Weber Test for Natural Rubber." H. J. Stern.

"Continuous Vulcanisation Processes." W. H. Reece.

"Neoprene Compounding." H. J. Lanning.

"Carbon Black Manufacture in Great Britain." Fred H. Amon.

"Abrasion Resistance and its Measurement." J. M. Buist.

"Stability of Compounded Latex." K. W. Hayes.

"Determination of Copper in Rubber Latex." F. C. J. Poulton and M. E. Tunnicliffe.

"Oxidation of Natural Rubber Hydrocarbon." L. Bateman.

"Continuous Vulcanisation with reference to Flooring, Belting, etc." J. M. Bierer.

"Determining the Dynamic Coefficient of Friction of Vulcanised Rubber." A. Boonstra.

"Treatment of Abnormal Clonal Latices." E. W. Madge.

"Use of Statistical Methods in the Planning of Road Wear Tests." J. M. Buist, R. G. Newton and E. R. Thornley.

SUBSCRIPTION $10.00 PER ANNUM FOR SIX ISSUES, POST FREE. PUBLISHED BI-MONTHLY.

"ANNUAL REPORT ON THE PROGRESS OF RUBBER TECHNOLOGY 1949"

A readable and informative record of the outstanding developments in rubber technology made in the year.

PUBLISHED DECEMBER, 1950. AVAILABLE AT $3.00.

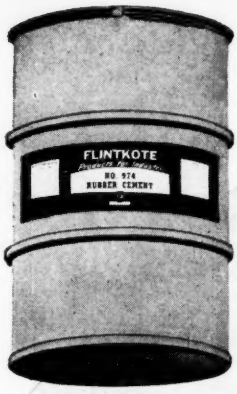
"PROCEEDINGS OF THE RUBBER TECHNOLOGY CONFERENCE, London, 1949."

Containing the 43 papers read at the Conference, together with resultant discussions, covering every recent development in the chemistry and physics of natural and synthetic rubbers.

COPIES AVAILABLE AT $10.00.

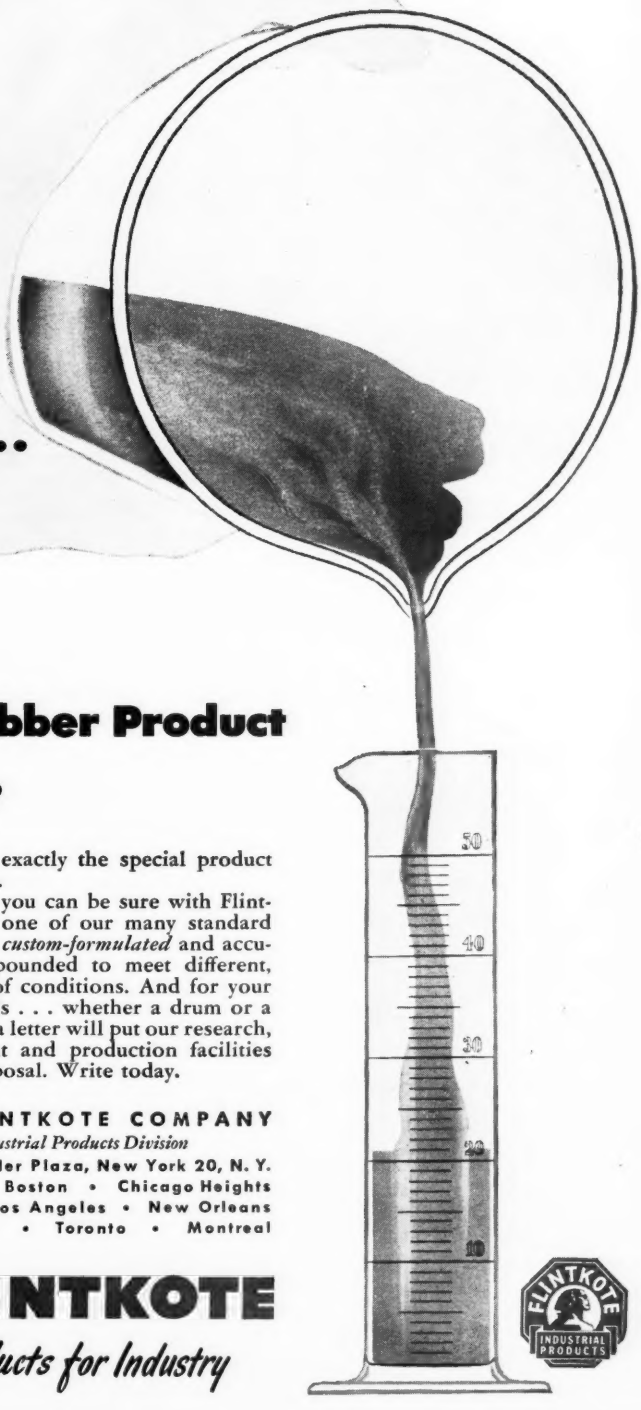
Enquiries for literature and details of membership to:—

THE REGISTRAR
INSTITUTION OF THE RUBBER INDUSTRY
12, WHITEHALL
LONDON, S.W. 1, ENGLAND



Ready-Made...

or To-Your-Measure...



...What

Custom-Formulated Rubber Product

Do You Need?

OURS is an industry without an "all-purpose" product. Your requirements may be *similar* to another's. But even a slight variation can demand completely different characteristics in materials you use in fabricating, compounding or processing.

That's the reason for Flintkote's "two-edged" production policy.

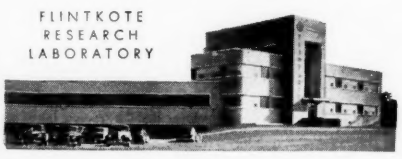
We make a wide line of standard products: adhesives, cements, laminants, impregnants, sizings, coatings and the like. Many plant operators find just what they need among this group.

But as to your needs . . . our technicians will welcome the opportunity to work with your staff or independently to develop exactly the special product you require.

In short, you can be sure with Flintkote. Each one of our many standard products is *custom-formulated* and accurately compounded to meet different, given sets of conditions. And for your *special* needs . . . whether a drum or a carload . . . a letter will put our research, development and production facilities at your disposal. Write today.

THE FLINTKOTE COMPANY
Industrial Products Division
30 Rockefeller Plaza, New York 20, N. Y.
Atlanta • Boston • Chicago Heights
Detroit • Los Angeles • New Orleans
Washington • Toronto • Montreal

FLINTKOTE RESEARCH LABORATORY



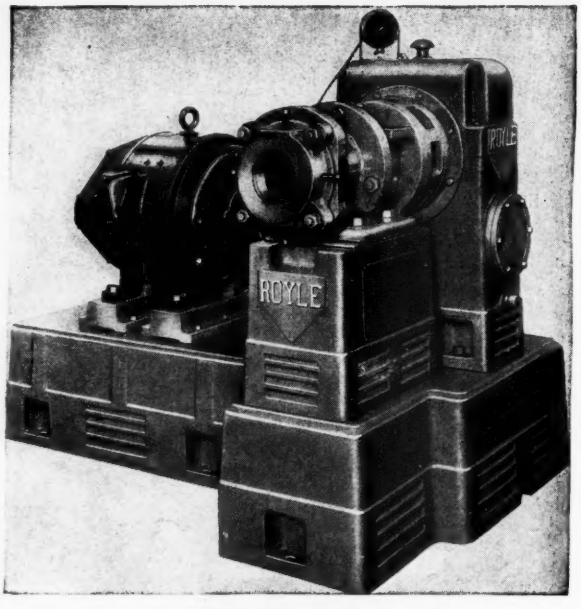
FLINTKOTE
Products for Industry

FLINTKOTE INDUSTRIAL PRODUCTS

Designed To Extrude RUBBER or PLASTICS

IN these days of rapidly changing developments owners of Royle extruding machines are in the advantageous position of being able to adapt their extruders to either rubber or plastics production. If you are faced with the problem of extruding rubber and plastics the versatility of ROYLE extruders is of paramount importance to you. Whether you require a light or heavy production extruder features have been incorporated to assure maximum results. The change-over is quickly and simply accomplished.

Send for your copy of Bulletin No. 448. It describes these features and how they may be applied to older type extruders.



ROYLE # 2 Extruding Machine. Non-extended cylinder, plain tubing head.

JOHN ROYLE & SONS

ROYLE PATERSON N. J.

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN 1880

London, England
James Day (Machinery) Ltd.
REgent 2430

Home Office
J. W. VanRiper
SHerwood 2-8262

Akron, Ohio
J. C. Clinefelter
JEfferson 3264

Los Angeles, Cal.
H. M. Royal, Inc.
LOgan 3261

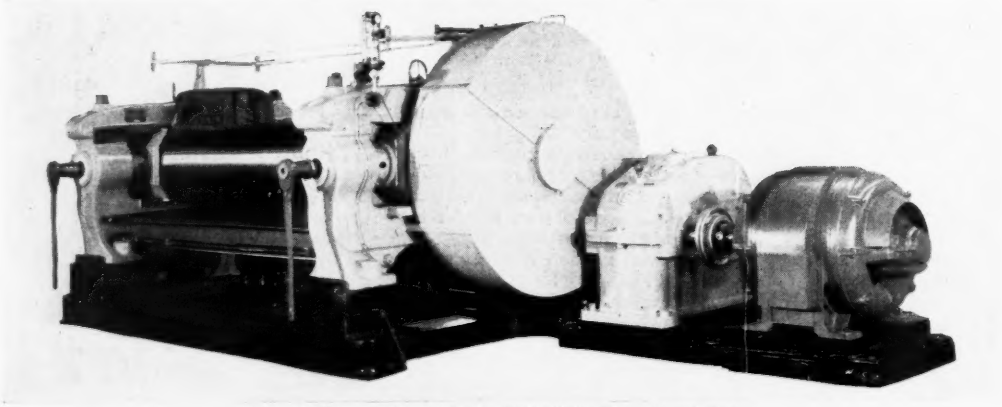
PATERSON 3, NEW JERSEY

HEAVY DUTY RUBBER MILLS

10 FRAME SIZES—7" to 84" ROLLS

Standardized, up-to-date designs for every milling or sheeting requirement. Modern compact floor level drives.

STURDY — DEPENDABLE — ECONOMICAL



Frame #8 — Heavy Duty 84" Mill, Floor Level Drive

STEWART BOLLING & COMPANY INC.

3190 East 65th Street — Cleveland 27, Ohio — Tel.: Michigan 1-2850

MILLS • INTENSIVE MIXERS • CALENDERS • REFINERS • CRACKERS • GEARS
HYDRAULIC PRESSES • PUMP UNITS • BALE SLITTERS • SPEED REDUCERS

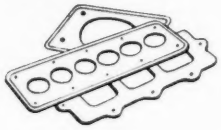
PICCOUMARON

Para-Coumarone-Indene

RESINS

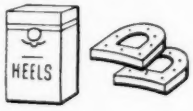
A GROUP OF THERMOPLASTIC SYNTHETIC RESINS USEFUL FOR:

TUBULAR GOODS



GASKETS

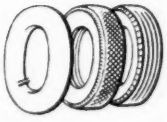
WATERPROOFINGS



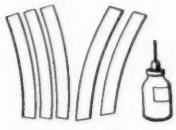
HEELS

HARD RUBBER GOODS

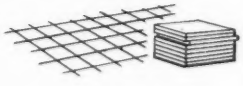
TOYS



TIRES AND TUBES



ADHESIVES



FLOOR TILE

WAX COMPOUNDS

BELTING

SHOES • BOOTS

CEMENTS

JAR RINGS

TEXTILES

The applications shown above indicate some of the almost endless uses for this excellent resin.

Piccoumaron Resins are available in grades from liquids to brittle solids. Colors vary from pale yellow to deep reddish brown. They are soluble in coal tar, turpentine, terpene and most chlorinated solvents. Good resistance to acids, alkalies and salt.

Write for samples and complete data on PICCOUMARON Resins.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP.
Clairton, Pennsylvania

Plants at
Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.

Distributed by
Harwick Standard Chemical Co., Akron 5, Ohio

IF YOU WANT TO

INCREASE STIFFNESS

OF YOUR LATEX PRODUCTS

For example, seven parts of Du Pont "Ludox" colloidal silica solids per 100 parts neoprene latex produced a thread with approximately doubled modulus over the entire range of elongation. Significant increases in modulus can also be expected in thread made of natural rubber.

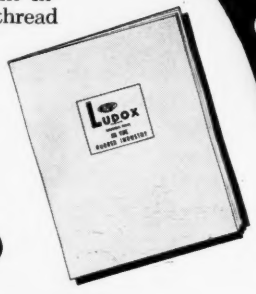
"Ludox" also improves other latex products

★ Reduces tack of coating materials
★ Reduces solids required in neoprene latex foam
★ Increases toughness of latex coatings
★ Adds stiffness to latex films and coatings
★ Increases bond strength of latex adhesives
★ Use these effects to build better products—new applications.

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

GET THE FACTS ON LUDOX®
COLLOIDAL SILICA



New Technical Bulletin
shows how you can use Du Pont "Ludox" colloidal silica in your latex products. Write: E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, IRW-5, Wilmington 98, Delaware.

A-C INV SUPPLY CO.

SERVICE
QUALITY
DEPENDABILITY

Our New Home...

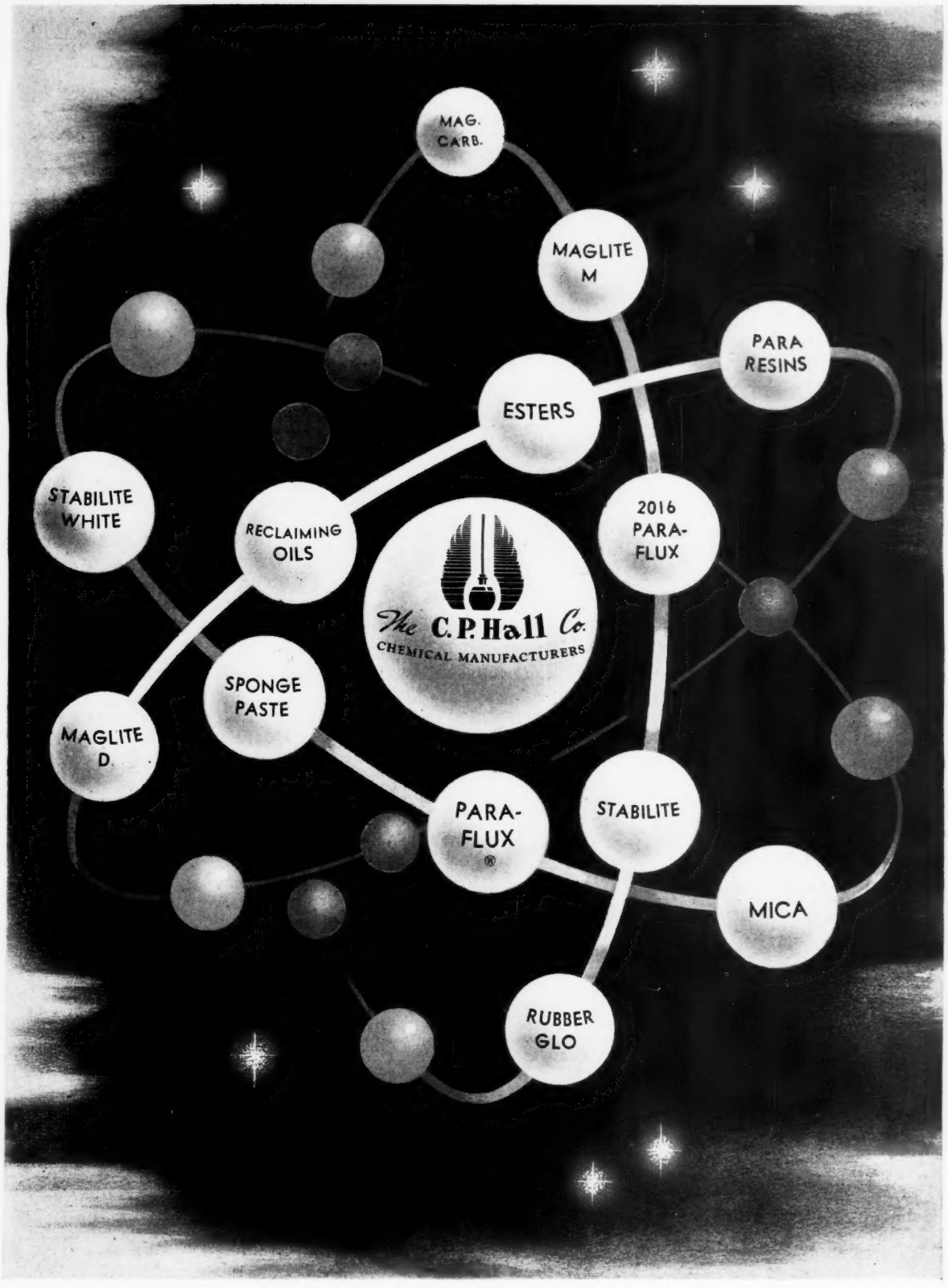
— a result of service, quality, and integrity. We can offer still better service to you through our expanded facilities and improved working conditions.

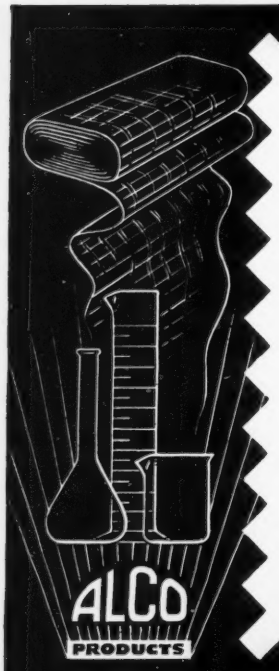
Electrical Equipment for
CALENDERS • EXTRUDERS • MILLS • BANBURYS • CONVEYORS
ELECTRICAL AND MECHANICAL ENGINEERS
ALL EQUIPMENT—NEW or USED—FULLY GUARANTEED
CONTROLS • MOTORS • REDUCERS • MOTOR-GENERATOR SETS

THE A-C SUPPLY COMPANY

P. O. BOX 991 AKRON, OHIO

1100 HOME AVE. TELEPHONE HEmlock 6188


MAG. CARB.
MAGLITE M
PARA RESINS
ESTERS
STABILITE WHITE
RECLAIMING OILS
2016 PARA-FLUX
The C.P. Hall Co.
CHEMICAL MANUFACTURERS
SPONGE PASTE
MAGLITE D
PARA-FLUX ®
STABILITE
MICA
RUBBER GLO



VULCANOL*

A Group of Latex Compounds for Sizing, Coating and Impregnating Textile Fabrics.

ALCOGUM

Synthetic Thickeners for Latex Compounds.

VULCARITE

Dispersions of Latex Compounding Chemicals.

★ ★ ★

Technical information and samples available promptly upon request.

*Registered Trademark

ALCO OIL & CHEMICAL CORPORATION
TRENTON AVE. and WILLIAM ST., PHILADELPHIA 34, PA.

SOUTHERN DISTRIBUTORS
WICA COMPANY INC.
CHARLOTTE, N.C.

QUALITY **INTEGRITY** **SERVICE**
70 YEARS WITHOUT REORGANIZATION

BELTING
Transmission—Conveyor—Elevator

HOSE
for every purpose
Water—Fire—Air—Steam

HOME RUBBER CO. TRENTON, N.J. STEAM NEVER BURN BLOW OUT. PACKING. CHICAGO NEW YORK

PACKING
Sheet & Rod Packings
for every condition

Mechanical Specialties of Every Description

HOME RUBBER COMPANY
Factory & Main Office
TRENTON 5, N. J.

LONDON: 107 Clifton St., Finsbury CHICAGO: 168 North Clinton St. NEW YORK: 80-82 Reade St.

Top-Quality that never varies!

THE GENERAL TIRE & RUBBER COMPANY
AKRON, OHIO

WABASH, IND. • HUNTINGTON, W. VA. • WACO, TEXAS
BAYTOWN, TEXAS • BARNESVILLE, GA. • PASADENA, CAL.
JEANNETTE, PA.

Associated Factories:

CANADA • MEXICO • VENEZUELA • CHILE • PORTUGAL
UNION OF SOUTH AFRICA

Colorful Living Begins on a Calender

An exciting new era of color has been brought to America; and modern plastics have contributed greatly to its advance. Gossamer-light but sturdy table covers and shower curtains, lovely floral drapes, gleaming dinnerware, upholstery coverings in the clear, rich tones of woven fabrics—science and skills have been developed to produce them all in plastics. No other medium offers the designer such range and richness of color, combined with other properties required for fabrication in industry.

For over 60 years Adamson United has had an important part in perfecting modern equipment and methods for the satisfactory and economical production of calendered materials.

If your plans call for new installations either of single units or of complete electronically controlled trains with all accessories, consult us. Our development, designing and manufacturing facilities are at your service.

SINCE 1892

. . . leaders in the Development, Design and Manufacture of Basic Machinery and Processes for Rubber and Plastics

Adamson United Company

730 Carroll Street

Akron, Ohio

Sales Offices In Principal Cities

Subsidiary of United Engineering and Foundry Company

Plants at: Pittsburgh • Vandergrift • New Castle • Youngstown • Canton

Improve your vinyl plastics operations and cut costs

...with "Dutch Boy" DS-207

...here's a co-stabilizer with a triple advantage

"Dutch Boy" Stabilizers

PRODUCT	USE
TRI-BASE (Tribasic Lead Sulphate)	Electrical and other compounds requiring high heat-stability
TRI-BASE E (Basic Lead Silicate Sulphate Complex)	Low volume cost insulation
DS-207 (Dibasic Lead Stearate)	Sheeting, extrusion and molded compounds, i.e., insulated wire and vinyl phonograph records
PLUMB-O-SIL A (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored sheeting and upholstery stocks
PLUMB-O-SIL B (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent film and sheeting, belting
PLUMB-O-SIL C (Co-precipitate of Lead Orthosilicate and Silica Gel)	High grade insulated wire and sheeting
DYTHAL (Di-basic Lead Phthalate)	General purpose stabilizer for heat and light
DYPHOS (Di-basic Lead Phosphite)	Excellent for heat and light in all opaque stocks, including Plastisols and Organosols
NORMASAL (Normal Lead Salicylate)	Vinyl flooring and other compounds requiring good light-stability

You use only half of one per cent, or so—*But See What You Get* with "Dutch Boy" DS-207—a co-stabilizer that speeds production, upgrades quality, and cuts costs.

DS-207 provides solid phase lubricity at all temperatures, and is highly dispersible. Thus, processing is smoother and faster, both in calendering and in molding.

DS-207, stable at temperatures nearing 600°F. imparts excellent heat- and light-stability as a co-stabilizer. Tack control is good. It also increases water- and solvent-resistance in finished products.

Let our technical staff show specifically what DS-207—and the other "Dutch Boy" chemicals—can do for you. Call on us.

Dutch Boy* **CHEMICALS**

*Trademarks Reg. U. S. Pat. Off.

NATIONAL LEAD COMPANY, *111 Broadway, New York 6, N. Y.*

DOUBLE-CHECKED ✓ CHEMICALS FOR THE RUBBER INDUSTRY

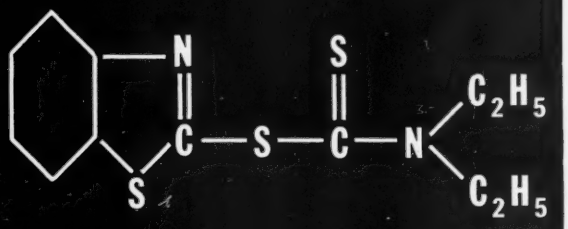
Self-Activating Primary Accelerator

SHARPLES ACCELERATOR

ETHYLAC

2-BENZOTHIAZYL-N-N-DIETHYL THIOCARBAMYL SULFIDE

V, 6.10-73/1-5C-1248



Combines the essential chemical structures of both thiazole and thiuram types of accelerator.

Exhibits high activity; good delayed action; good processing properties.

Is non-discoloring; practically dust-free.

Requires no special handling precautions.

Has excellent storage stability.

Samples and compounding data available on request.

For further information, write to Dept. P.

PROPERTIES:

Color . . . light yellow to tan

Odor . . . . . characteristic

Melting Point . . 71°C. min.

Volatiles . . . . 0.5% max.

Specific Gravity 1.27

Mol. Wt. (calcd) . . . 282.4

SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS INC.

NEW YORK
PHILADELPHIA
AKRON
CHICAGO

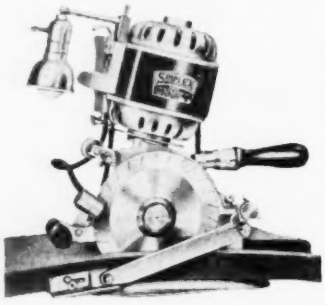
INTERMEDIATES FOR RUBBER CHEMICALS
ACCELERATORS • VULCANIZING AGENTS • PLASTICIZERS
WAX • POLYMERIZATION CONTROLLER

SIMPLEX
REG. TRADE MARK

NEW RUBBER STRIP CUTTER

PATENTED

A NEW PORTABLE MACHINE capable of stripping slab rubber up to 2" thick at the rate of 20,000 feet in 8 hours. Any width desired.



SPECIAL FEATURES: micro-adjustment for accurate widths; equipped with water tank which feeds water to slotted knife and into cut; has repulsion induction motor which carries any overloads; automatic sharpener keeps knife sharp; base with rollers for easy handling; cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber; cuts slab down to the last shaving; cuts all grades of rubber including pure gum, sponge, etc.; cuts squarely—no rejects.

Now in use by many leading Rubber Manufacturers & Jobbers

Simplex Cloth Cutting Machine Co., Inc.
270 West 39th St. New York 18, N. Y.
Cable Address: SIMPLEX, N. Y.
Phone: WIsconsin 7-5547

FRENCH OIL HOT PLATE PRESSES

2435

Side plate or column presses for compression or transfer or injection molding of rubber and allied synthetics.

Write for bulletins on "Modern Hydraulic Presses."

The FRENCH OIL MILL MACHINERY CO.
PIQUA, OHIO

CRUDE RUBBER

Synthetic Rubber
Liquid Latex

•

THE SOUTH ASIA CORP.

Importers-Dealers Crude Rubber
11 BROADWAY, NEW YORK, N. Y.
Digby 4-2050

BROADSTREET BANK BLDG.
TRENTON 8, NEW JERSEY
TRenton 2-8519

TIRE MOLDS
SPECIAL MACHINERY
TEAR TEST EQUIPMENT

☆

Fair Prices
Reliable Delivery
Good Workmanship

☆

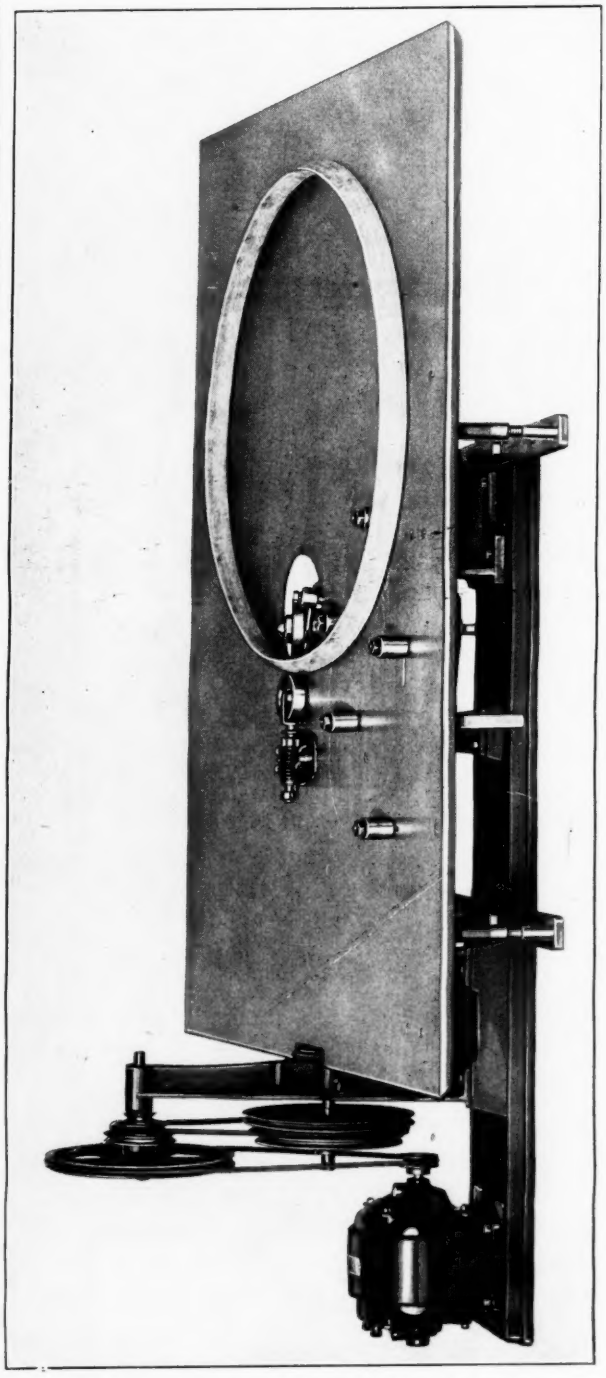
Your Inquiries are Solicited

THE AKRON EQUIPMENT CO.
AKRON 9, OHIO

T. W. MORRIS TRIMMING MACHINES

Are Incomparable

EST. 1917



#11 Automatic Trimmer. Rings Inside and Outside.

Are you trimming . . .

Heels
Soles
Water Bottles
Taps
Syringes
Bathing Caps
Strips
Mechanical Packings
V-Belts
Fabric
Sponge
Plastic
Toys
Automotive rings
Boots
Tires
Balls
Mats

. . . etc.?

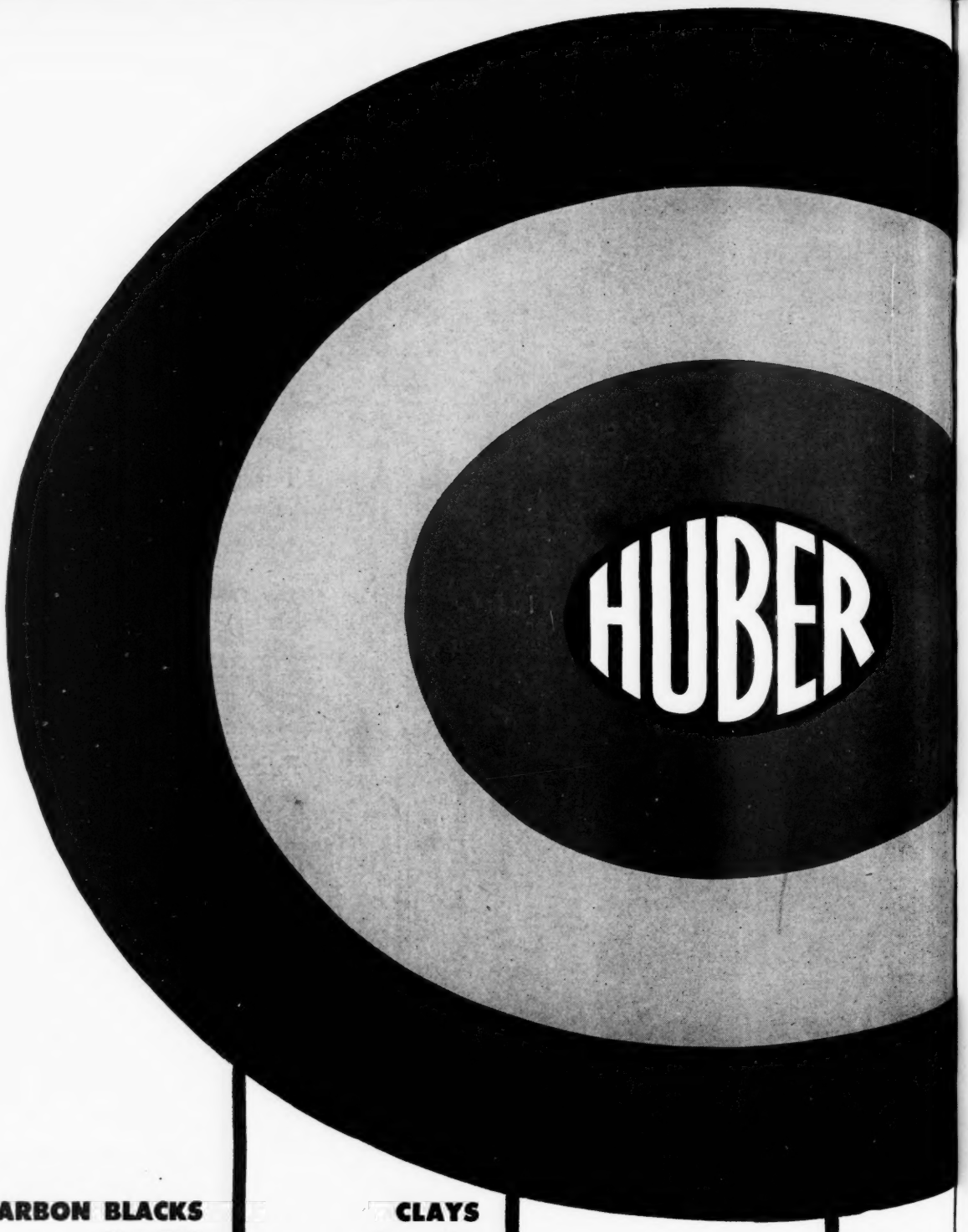
There is a MORRIS Trimmer for every trimming job

The World's Trimmers

Mail Address

6301 WINTHROP AVE., CHICAGO 40, ILL.

Phone Sheldrake 3-1221 Cable "Mortrim"



CARBON BLACKS

Wyex (EPC)
Easy Processing Channel Black

Arrow TX (MPC)
Medium Processing Channel Black

Essex (SRF)
Semi-Reinforcing Furnace Black

Modulex (HMF)
High Modulus Furnace Black

Aromex (HAF)
High Abrasion Furnace Black

CLAYS

Suprex Clay
High Reinforcement

Paragon Clay
Easy Processing

Hi-White R
White Color

Hydratex R
Water Fractionated

RX-43
Water Fractionated (Super)

RUBBER CHEMICALS

Turgum S, Natac, Butac
Resin-Acid Softeners

Aktone
Accelerator Activator

J. M. HUBER CORPORATION, 100 Park Ave., New York 17, New York

INDIA
RUBBER WORLD

A Bill Brothers Publication

MARCH, 1951
Vol. 123—No. 5

SUBSCRIPTION PRICES

United States and Mexico, $3.00 per year; Canada, $4.00; all other countries, $5.00. Single copies, 35¢.

Other Bill Publications are: FOUNTAIN SERVICE, GROCER-GRAPHIC, PREMIUM PRACTICE, RUG PROFITS, Sales Management, TIRES Service Station, YANKEE FOOD MERCHANT.

Copyright March, 1951
Bill Brothers Publishing Corp.

Table of Contents

Hydraulic Presses and Hydraulic Press Users
Harry A. Trishman 673

Studies of Relaxation Characteristics of Non-Metallic Gasket Materials
R. G. Farnam 679

RMA Packing Specifications for Crude Rubber Should Be Made More Specific
C. B. McKeown and T. E. Williams 683

Proven Techniques for Dry Coloring Thermoplastics
Sanford E. Glick 687

Akron Group Symposium on Statistical Quality Control 690

Departments

Editorials 686
Plastics Technology 687
Scientific and Technical Activities 690
News of the Month:
United States 698
Obituary 710
New Machines and Appliances . 712
Goods and Specialties 714
Rubber Industry in Far East ... 716
Book Reviews 722
New Publications 724
Bibliography 725

Market Reviews

Crude Rubber 726
Reclaimed Rubber 726
Scrap Rubber 726
Cotton and Fabrics 728
Rayon 728
Compounding Ingredients 730

Statistics

United States, for November, 1950 710
Imports, Exports, and Reexports of Crude and Manufactured Rubber 736
Tire Production, Shipments, and Inventory 736

CLASSIFIED ADVERTISEMENTS . 738
ADVERTISERS' INDEX 741

INDIA RUBBER WORLD assumes no responsibility for the statements and opinions advanced by contributors.

A BILL BROTHERS PUBLICATION

Published Monthly by

BILL BROTHERS PUBLISHING CORPORATION

Editorial and Executive
386 Fourth Ave.,
New York 16, N. Y.
LExington 2-1760.

Office of Publication
Orange, Conn.
Chicago Office: 333 N. Michigan Ave.
STate 2-1266.

Editorial Advisory Board

JOHN BALL
P. D. BRASS
BERNARD H. CAPEN
C. C. DAVIS
S. D. GEHMAN
WILLIAM C. GOGGIN
ARTHUR E. JUVE
WILLIAM E. KAVENAGH
R. A. SCHATZEL
JOHN N. STREET

B. BRITTAIN WILSON, *General Manager*
ROBERT G. SEAMAN, *Editor*
S. R. HAGUE, *Managing Editor*
ARTHUR M. MERRILL, *Associate Editor*
RUFUS H. FAIRCHILD, *Advertising Manager*
M. J. McCARTHY, *Circulation Manager*
M. A. LARSON, *Production Manager*

Chairman of Board and Treasurer
RAYMOND BILL

Vice Presidents
RANDOLPH BROWN
B. BRITTAIN WILSON
C. ERNEST LOVEJOY

President and General Manager
EDWARD LYMAN BILL

INCREASED GR-S SUPPLY - - -

Suggests

REOGEN-BONDOGEN

Use Both of Them

for Processing

RODFORM CUMATE

For Speeding Cure

R. T. VANDERBILT CO. INC.

230 Park Avenue, New York 17, N. Y.

INDIA
RUBBER
WORLD

VOL. 123 — NO. 6 MARCH, 1951

Hydraulic Presses and Hydraulic Press Users

Harry A. Trishman[1]

UNDOUBTEDLY the press user is less interested in presses than he is in the articles they will produce, which, on second thought, is perhaps the way it should be. On the other hand a broader concept of presses, their construction, and operation, might enable the press user to produce more articles, better articles, and also articles of a wider variety. By the same token, the press manufacturer could probably produce a much better press if he could obtain a clearer knowledge of the customer's materials, processes, and difficulties in general.

To the veteran press user this article may seem like turning back the pages of history. Yet there may be many new press users desiring additional information in this field. When ordering such equipment, no press user would deliberately go out of his way to confuse the issue in the course of telling the press manufacturer what type of press he wants and how he intends to use it; yet in many instances the most important points are either treated very lightly or neglected entirely. Of course the main questions are price and delivery, and in the case of an export agent he may emphasize, "be sure to state my resale commission," without even describing the machine at hand.

Naturally the press user cannot be expected to have a complete understanding of how hydraulic presses are made, of what they consist, and also all of the uses for which they are intended. Hydraulic presses have played an indispensable part in industry for more than a century, and their applications are rapidly increasing, made possible by better materials, constantly improved pumping systems, valving and controls, and also by larger and better machine tools for producing the presses. A list of the different types of hydraulic presses would run into several hundred, and the number of different articles now produced on hydraulic presses would run into many thousands, and they are rapidly increasing every day. This is all in addition to and not to be confused with the mechanically operated press which is an entirely different breed of cat.

[1] Manager, hydraulic press division, Erie Foundry Co., Erie, Pa.

Hydraulic *vs.* Mechanical Presses

As is explained briefly below, within a small scope the hydraulic and the mechanical press can accomplish the same purpose, i.e., stamping, forming, etc.; but owing to their entirely different actions, strictly speaking, neither press can do the work of the other, although in isolated cases a combination of the two can attain remarkable results.

The mechanical press (see Figure 1) consisting essentially of a crank with connecting rod, causing a reciprocating motion of a cross-head, can make many strokes per minute (a good average is about 75) and near the

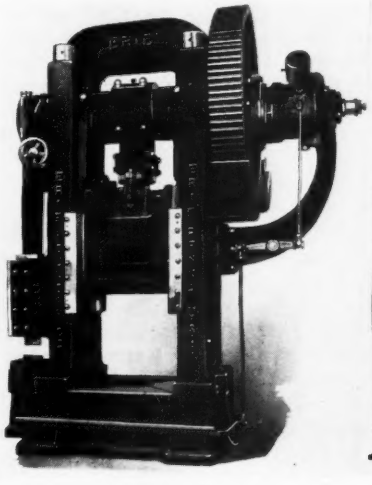


Fig. 1. Example of a Mechanical Press

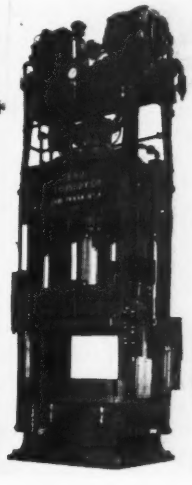


Fig. 2. Example of a Hydraulic Press

end of its stroke can develop a reasonably high tonnage which acts through a very short distance only. The actual tonnage or pressure developed varies and depends entirely upon the resistance of the work it meets. The pressure increases gradually until the end of the stroke is reached; at which time the pressure is gradually released as the cross-head starts back to begin another stroke.

The hydraulic press (see Figure 2) is slower in action (10 to 15 strokes per minute being pretty fast unless they are very short), but the strokes of a hydraulic press can be extremely long and act in a straight line. The hydraulic press can exert its full tonnage immediately at the start of the stroke and can continue to exert this full tonnage throughout its entire stroke. Or it may move a certain distance and stop, but continue to hold full tonnage for a long period of time. The hydraulic press will never exert more force than that corresponding to its original hydraulic line pressure. The hydraulic press can be operated at lower tonnages, if desired, by reducing the pressure of the fluid entering the cylinder.

Hydraulic Press Capacities

Small presses used as jacks, arbor presses, laboratory units, or for other light work may exert a force of five or 10 tons. From this size they increase up to many thousands of tons, depending upon the work to be done. One of the largest single-unit all hydraulic presses in the world will develop 18,000 tons. Another twin-unit press, consisting of two presses attached side by side, having a common moving bolster is understood to develop 28,000 tons. These are huge machines, for heavy forging work, stand several stories high above floor level; the strain rods remind one of the trunks of Sequoias before being sawed. These presses are operated by motor driven pumps discharging into large gas-loaded accumulator bottles. Other presses of the steam hydraulic type up to 15,000-ton capacity were introduced as long as a half century ago.

Presses for Plastics and Rubber

Of the many types of hydraulic presses now in use, only a small percentage is used for processing plastics and rubber. Nevertheless there is a variety of types and sizes, with capacities up to 5,000 tons not being uncommon. Injection molding machines have now become largely a standardized item, being constructed with hydraulic clamping capacities of 150 to 200 tons for the smaller machines and increase by steps, reaching 4,000 and 5,000 tons' clamping capacity for the larger sizes. These capacities are on the rapid increase. These presses, however, are constructed with motorized self-contained pumps and controls and are largely a packaged unit. Transfer molding presses, lead encasing presses, and others, complicated as they may be, are purchased as such and taken for granted. The simplest form of press, i.e., the common platen press, though, becomes the subject of greatest controversy. These presses are of so many different kinds and are used with different sizes of molds, or often used without molds, that they become more or less a general utility machine, frequently expected to do almost anything; this may perhaps be the reason for this confusion. However, many of these simple presses, "both old and new," in use today are not performing satisfactorily owing either to misapplication, poor construction, or both, or they might simply be suffering from old age.

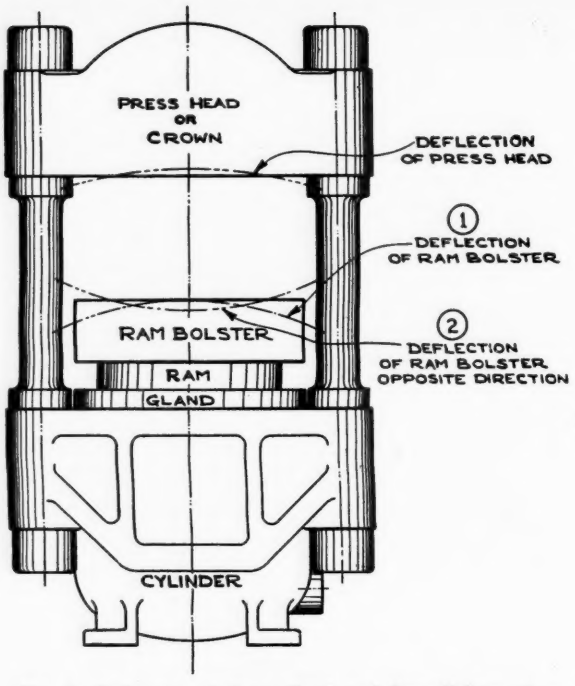


Fig. 3. Deflection of Press Head and Ram Bolster of a Hydraulic Press

Press Selection

Platen presses are usually of the up-acting gravity return type although once in a great while an inquiry will ask for the down-acting type. This latter type-construction complicates the platen supports, and the platens must be lifted by pull-back cylinders as the press opens, and this arrangement should be avoided except in dire necessity. Platen presses may be of strain rod or strain plate construction; each has its advantages, but does not differ too much in price for a given capacity; the price difference depends largely upon the shop tooling facilities of the press builder.

The strain rod is the older type and is indispensable if the press is to be worked from the sides as well as from the front or the back. Unless the strain rod is properly designed, difficulty arises from rod failures and particularly the loosening of the rod nuts, especially if the press is subjected to continual "bumping." Strain rods offer extremely poor guiding members for moving ram bolsters and platens of "hot presses" because of the heat and expansion differentials between the press head, platens, bolster, and cylinder. The cylinder is much cooler than the press head; also the bolster is cooler than the press head; but the platens are hottest of all and expand enough to cause their guides to exert a severe side thrust against the strain rods.

Strain plate presses are more rigid, especially from front to back, than the rod type, and owing to the heavy mass of metal covering the sides of the presses entirely, they hold the heat better and have been known to reduce the cure time. Strain plate presses definitely offer better guiding and, if constructed properly, have the same guiding clearance, whether hot or cold.

Platen presses, unless otherwise specified, are designed for a uniformly distributed load over at least about 80% of the platen area. If the presses are intended for loading over a smaller and more concentrated area, this fact

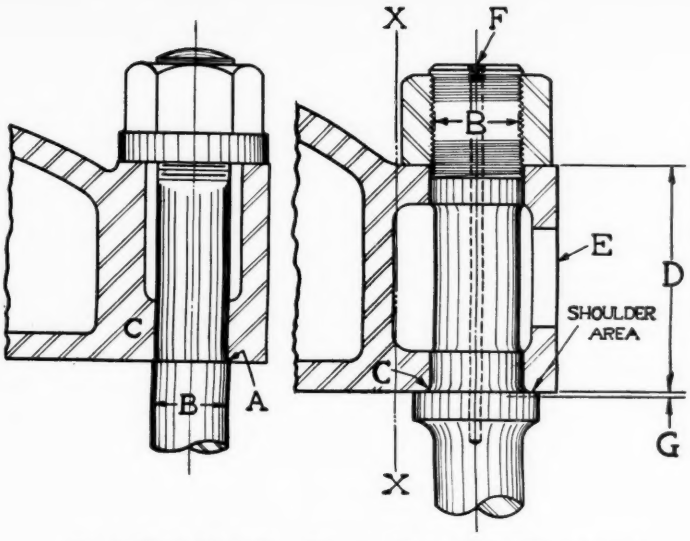


Fig. 4. Strain Rod with Small Shoulder

Fig. 5. Strain Rod with Adequate Shoulder Area

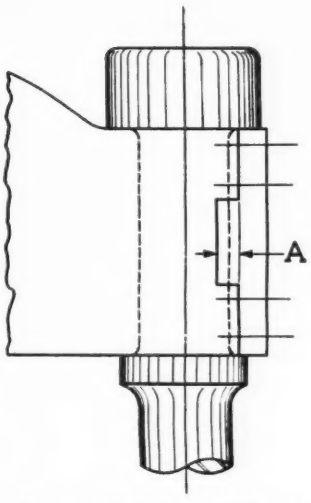


Fig. 6. Strain Rod with Forged Head Instead of Nut

should always be specified. If the load is intended to be placed "off center" of the press, this requirement should also be specified, and the strain members should be larger to resist the bending load thus produced. This bending load increases in direct proportion to the distance of eccentricity, and the stresses produced add to the already existing tensile stresses in the strain members resulting from the thrust of the ram.

The tonnage capacity should always be selected to suit the area of largest mold (such area to include the extreme outside of the overflow cavity.) This area, multiplied by the curing pressure necessary for the hardest stock, measured in pounds per square inch (ranging from approximately 300 psi. for soft stocks to approximately 1,000 for hard stocks in rubber, and several times more for plastics) divided by 2,000 signifies the tonnage capacity. For deep molds this factor should be increased from 10 to 25% for each increased inch of depth of mold cavity. It is good economy to buy a press of slightly more tonnage capacity than necessary. In this way the user is sure the molds will close and that the finished product will not be oversize in thickness and waste valuable raw material. A press should never be purchased for very much more tonnage capacity than is necessary because the price of heavier presses increases rapidly. The point, however, is that it is better to have the press slightly over capacity than under capacity.

Presses as a rule are designed with sufficient ram travel to close the press without any molds between the platens. However if the daylight openings are quite great, for extremely deep molds, and if the press is never to be closed without molds, the ram stroke should be specified. A press built with a longer cylinder and longer ram than is necessary is not an economical purchase.

The *big* bugaboo is deflection, deflection meaning bending of the press head or crown and the moving bolster caused by the pressing force. (See Figure 3.) Years ago deflection was not considered at all, and poorly molded articles, excessively thick in undesirable spots, were being constantly produced, with a high percentage of rejects as a result. Years ago press heads or crowns were designed from a strength standpoint only; that is, they were designed to withstand the load of the press without breaking. Under this system they could bend as much as 1/16-inch or even more, and by the same token the ram bolster or moving platen in many cases bent the same amount, but in the opposite direction. It is quite apparent what effect this action would have on molded goods. Present-day practice is to proportion the strength of the bolster so that it will bend the same amount and in the same direction as the press head (within certain limits.) The limits to which these surfaces can be out-of-parallel and still produce a satisfactory molded product is termed "the permissible out-of-parallel." For certain classes of work, such as using thin molds or no molds at all, a great amount of deflection is permissible provided the maximum out-of-parallel is not exceeded. This factor should always be stipulated by the press buyer.

If the molds are deep and inclined to be frail, they can become greatly distorted if placed in a press which would bend 1/16-inch in the head member, or in the ram bolster either for that matter, and in such cases the *maximum deflection* should be specified and maximum out-of-parallel also, if important. The maximum deflection in many cases is held down to as low as 0.004-inch depending to some extent upon the size of the platen. A press having this amount of stiffness in the head or bolster members must be several times stronger, weighing more and also being more costly, and should not be specified if not absolutely necessary.

One more thing is to be remembered. The platens in a press do not add more than a microscopic amount to the strength, or resistance to bending, that is developed by the press head or bolster. It would require between 500 and 1,000 platens to have the same resistance to bending that is built into the average press head, depending, of course, upon the width of the press.

It is always helpful to the press buyer as well as the press builder to make the specifications in the inquiry as complete as possible, and mention also the use or purpose for which a press is intended. Often the press builder, being familiar with current processes, could make suggestions resulting in valuable savings if he only knew what the customer is attempting to do. If a press is to

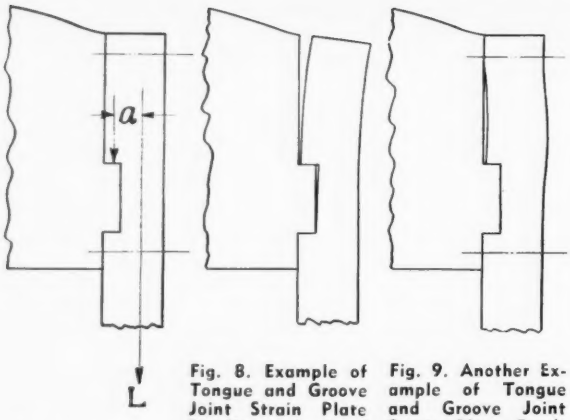


Fig. 7. Strain Plate with Tongue and Groove Joint

Fig. 8. Example of Tongue and Groove Joint Strain Plate Bending under Load

Fig. 9. Another Example of Tongue and Groove Joint Strain Plate Bending under Load Even When Top of Plate Is Held in Place by Studs

be operated on an existing hydraulic system, the hydraulic working pressure should always be stipulated. If the existing line pressure is only 1,500 psi., the user is foolish to order a press to operate on 2,000 psi., thinking that a greater factor of safety will be obtained. The price in the latter case is likely to be about 20 to 25% higher.

In describing a press having oblong platens, it is customary to mention the left to right dimension of the platen first, and the front to back dimension second. For example, a press having platens 48 inches *L* to *R* by 32 inches *F* to *B* indicates immediately that the span, which is of major importance, must be across the 48-inch direction, with the restraining members along the 32-inch side. The span determines the size of the press; the 32-inch dimension is only a minor factor. A 32- by 48-inch press would be much smaller in overall dimensions and lighter in construction than a 48- by 32-inch press because of the much shorter span.

Some Important Design and Construction Features

The following paragraphs are devoted to certain simple common elements of design and construction which may be helpful in making the proper selection of a hydraulic press.

Owing to increased loads and higher working pressures, cast iron is no longer considered an adequate material for main members (except rams) in hydraulic press construction and was abandoned many years ago by the best manufacturers. Cylinders, glands, moving bolsters, and cross-heads are generally steel castings, steel forgings, or of fabricated steel construction, and proper annealing is of vital importance. Rolled steel and also forgings are becoming more prominent for bolsters and cross-heads when not too complicated; this use is stimulated by the relatively higher present cost of steel castings.

Strain rods, although apparently a simple thing, have always been a source of trouble, most of which can be eliminated by observing certain important factors. The most common fault is shoulders that are too small. See Figure 4, where there is hardly any shoulder at all at *A*, and when the nut is tightened, the body *B* of the rod compresses the fibers of the metal and embeds itself into the rod lug *C*, thus allowing the nut to become loose. After several tightening operations on the nut, some rods become embedded more than others, resulting in effect of unequal lengths between shoulders. This condition places more strain on the short rod and less strain on the longer rods, resulting in a failure of the short rod. Replacement of the rod will only result in failure from the same cause, and the difficulty can never be eliminated until wider shoulders are provided.

Notice Figure 5 and how the shoulder width is increased. The shoulder area should never be less than 60% of the cross-sectional area at the root of the thread at *B*. Also there should be a liberal radius at *C*. Notice also how the rod is fitted through a bored hole at the top as well as the bottom of the lug.

Strain rods are preferably shrunk into place, which condition results in prestressing the rod for the distance *D*; but in so doing, extreme care must be exercised to avoid overstressing. The rods may be heated by a torch through slot *E*, but a better way is to use steam in the drilled hole *F* in the center of the rod. A safe procedure for prestressing the rods follows. Tighten all nuts metal-to-metal (not more); then load the press to its full working capacity, and measure the space of the opening which will be produced at *G*. The space at *G* represents the amount which the rod has stretched, the amount the rod lug has compressed, and also includes deformation in the nut resulting from the load applied. If a prestress of 10% is desired, all nuts must be taken up a distance of *G* + 10% of *G*. If rods and nuts are threaded, let us say six threads per inch, we know that one full 360-degree turn of the nut will result in 1/6-inch of take-up. If *G* + 10% of *G* should happen to be 1/12-inch, then if each nut is taken up one-half turn, the desired prestress can easily be obtained. After the load has been released, the rods may be heated until sufficient expansion is produced to allow the nuts to be taken up freely for whatever fraction of a turn has been determined, and allowed to cool. Factors other than 10% may be used, depending upon the strength of the rod and the prestress necessary to overcome shock reactions, but in any case the rods should all be prestressed as nearly equal as possible. Strain rods should always be fitted with a comparatively fine thread.

Rod lugs should always be sufficiently strong at *XX* (Figure 5) to withstand the bending plus the shear load. A noticeable fault in another type of rod lug, the one used with a rod having a forged head instead of a nut, is in the cap which covers the end of such type of lug. This cap should be mortised into the rod lug, as shown in Figure 6, and the area at *A* should be equal to the area of that portion of the rod head which bears against the rod cap. If this condition is not achieved, a severe bending load is produced in the strain rod, all of which is in addition to the tensile load, and failure of the rod results. The writer has seen many costly strain rods fail from this oversight in rod lug construction; and once a press has been built, any attempt to correct the difficulty is futile.

Strain rods have been replaced rather extensively within the past 18 years by the use of rolled steel plates fastened to the sides of press heads and cylinders and fitted with a tongue and groove joint to resist the load. The original assumption was that the compression against the tongue and the tension in the plate were equal, and a few small cap screws or studs would prevent the plates from falling off the press until the load was applied; after which they would give evidence of the strength of Hercules himself. The severe bending load

on the plates was overlooked completely although the slightest application of stress analysis would have instantly revealed its presence. There are several types of joints, but Figure 7 illustrates one form; all types, however, have the same typical problem.

The bending moment is equal to the load L multiplied by the distance a. When the load is applied, the plate will move, as shown in Figure 8, unless its strength will resist this bending. Even if studs are used to hold the top end of the plate in place, the plate can still bend, as shown in Figure 9, unless the plate is sufficiently thick to resist the bending moment La produced by the overhung load.

As mentioned previously in the article, a press of strain plate construction has many good qualities, but it must be properly designed.

A hydraulic press would be of little value without a cylinder since it is the medium by which the movement of the ram and the force of the press are produced. The cylinder has other duties, however, which in many cases appear to be completely overlooked. On a simple, single-ram press, of strain rod construction, the cylinder must also serve the duty of a beam, and the load on this beam can be terrific.

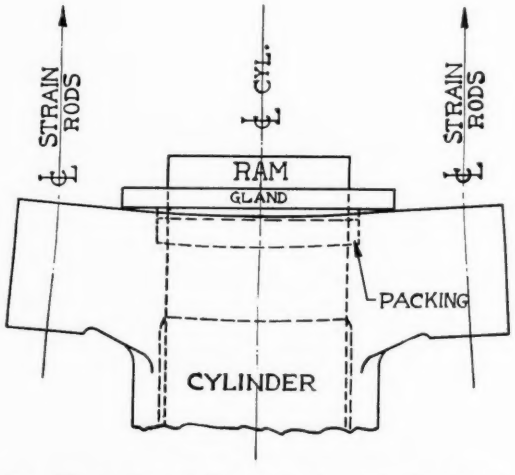


Fig. 10. Bending of Top of Inadequately Reinforced Hydraulic Press Cylinder under Load

Figure 10 represents the top of a cylinder, and if the former is not properly reinforced, it will bend exactly as illustrated. If the user watches the action of the presses in his shop, he may be unfortunate enough to find a press acting just as shown. Such action is bad for three reasons. First—the weakness can and will develop into a failure sooner or later. Strangely enough, however, the failure will be farther down, or if the cylinder is not very long, failure is liable to occur near the bottom. Second—when a cylinder bends as shown, it will be found that the top goes out of round, or takes the shape of an oval. The long way of the oval would be from front to back, and the short way of the oval would be from left to right, when Figure 10 is examined. The top of a cylinder is bored for a close fit on the ram, and the ram is intended to slide freely through the bored hole, even under maximum hydraulic pressure. Will this oval effect not produce excessive wear on the cylinder and on the ram? Third—this point is one for the press user to answer. If you question the maintenance man in your press room and ask him what parts of a press give him the most trouble, what will he say? Isn't he likely to say that it is the replacement of gland studs? If Figure 10 is observed closely, does it not appear as though the gland is being lifted off the top of the cylinder? Could this condition not be the cause of many of the gland stud failures? The writer has often wondered.

Of course, in any case the gland studs should be large enough to carry safely the load of the hydraulic medium acting against the packing plus the frictional load of the ram passing through the packing.

The tops of cylinders can and must be reinforced against this bending action. One simple and very effective method is to use a heavy flange, A in Figure 11, at the top of the cylinder and another heavy flange B extending across the cylinder farther down. These flanges must be pretty wide and in many cases are aided by vertical compression struts. The size of these flanges can be easily calculated, using R_1 and R_2, at the strain rod centers, for the reactions, and the loads L_1 and L_2 for the loads of the ram. If the cylinder has four strain rods, there is also a similar beam effect when the cylinder is viewed from the side of the press; but since these rods are generally closer together, the reinforcement required across the sides of a cylinder is not nearly so great as that required across the front and the back.

Many things could be said about cylinders, but space does not permit. The depth of throat below the packing should be at least as deep as one quarter the ram diameter, and the end of the ram should never be permitted to travel up into the throat more than a fraction of an inch. It is, however, essential that the ram end does travel into the cylinder this fraction of an inch because this action helps to keep the sides of the ram clean throughout its entire length. If the bottom ends of the rams are not kept clean, they are liable to build up with rust and become difficult to remove.

The shape of the bottom of a cylinder is important. The common shape for presses in the rubber and the plastics industry for years has been practically flat, as shown in Figure 12. This has probably been an outgrowth of the early days when such presses were seldom operated at more than 1,000 psi. hydraulic working pressure, and the cylinders were made of cast iron. As the

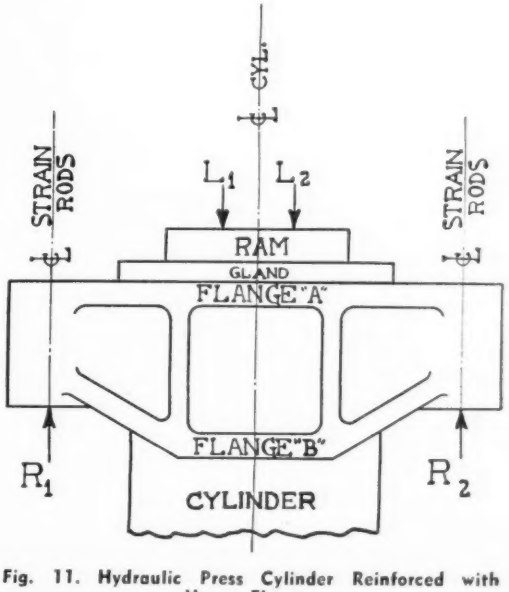


Fig. 11. Hydraulic Press Cylinder Reinforced with Heavy Flanges

pressures were increased, the cylinders were changed to cast steel and in many cases were cast from the same patterns by slight doctoring, but these cylinders were not too satisfactory.

When new patterns were made, the same general appearance was followed. The bottoms were flat, and a flange with holes for foot bolts was provided, making a surface for supporting the press on the foundation. Cylinders of this type are still being supplied, but are not the best to be had. Since the bottom is flat, its thickness must be nearly twice as thick as the side walls to produce uniform strength; and if the corner radius R in Figure 12 is not extremely liberal, very high stresses are liable to concentrate in this location. Failures in the bottoms of cylinders generally start from a crack at this location. The foundry always objects to the bottom being thicker than the side walls because the metal does not flow and feed properly, which condition also contributes to poor and also weak castings.

Another objection to a flat-bottom cylinder is that in many cases the designer fails to provide a slight recess under the bottom of the cylinder at the center, or the machine shop machines this surface flush across the entire bottom, or the space is filled with grout to provide an extra-good job of installing. All of these things are wrong. This space is of vital importance and should be maintained to allow the bottom of the cylinder to deflect downwardly under full load (and every cylinder will do this deflecting regardless of how strong it may be). If this space is not provided, the press will raise up each time the pressure is applied and settle down again as the pressure is released. If the bottom of the press is quite large in diameter and the press is some 10 or 15 feet high, the top of the press may sway from side to side as the pressure is alternately applied and released.

The latest and best shape for the bottom of a hydraulic press cylinder is an ellipsoidal shape where the length l of the ellipse is equal to the inside diameter of the cylinder and the width w of the ellipse is equal to the inside radius of the cylinder. See Figure 13. A cylinder of this type has the same thickness throughout the side wall and the bottom and also has uniform strength.

Some customers prefer to have a circular flange provided for use under a cylinder having an ellipsoidal bottom, in which case this must consist of a separate piece welded to the casting after it has been poured, but before annealing. It is just as good and more practical to provide four small feet consisting of flat steel plate welded in place. These feet can easily carry the weight of a large heavy press on a concrete foundation without exceeding the conservatively safe load of from 300 to 400 psi. on the concrete.

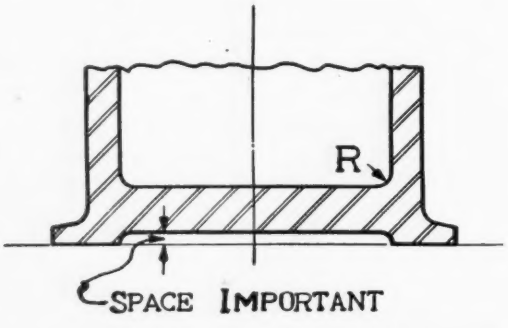


Fig. 12. Flat Bottom Hydraulic Press Cylinder with Proper Space under Bottom

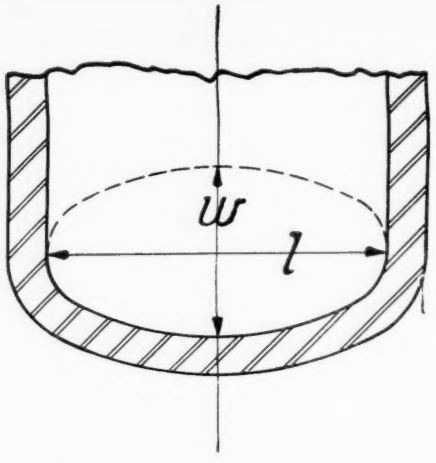


Fig. 13. Ellipsoidal Bottom for Hydraulic Press Cylinder

Summary and Conclusions

This article has now gone far enough, for we can already hear many ambitious associates screaming, "We don't care whether we have presses or what kind of strain rods or whether the cylinders have any bottoms in them at all. What we want is production—Don't you understand?"

At the same time, through the other ear, we hear from the man who is in trouble—his production is down—completely out on one article. He ushers you to his press room where you immediately recognize what *was a bargain*, but now is a total loss. How can it be repaired when it has already been straining itself to serve double-duty, starting originally from what was an extremely short life expectancy? There are also presses to be found everywhere, well selected, well constructed; many of them paid for themselves through the course of the first year, and have been in continuous trouble-free operation for a decade or more and shall undoubtedly be in operation for at least another 10 years.

Rubber Situation in Burma

BEFORE the second World War, Burma reportedly produced approximately 14,000 long tons of rubber annually, but recent estimates put the present total at about 8,000 tons. Of this amount, about 20% is produced by three estates which have a total area of 6,200 acres. The remaining 80% of the rubber is supplied by small units.

About 560 tons of rubber are annually consumed by local manufacturers of simple rubber articles. The three leading firms operate near Rangoon, one producing footwear, and the other two rubber blocks, balls, toys, and balloons. Burma's chief needs in rubber goods are tires, tubes, and footwear. In the last half of 1949 she imported 7,749 automobile tires, valued at 1,127,000 rupees;[1] 13,508 tubes, valued at 212,000 rupees; 7,047 cycle tires and 6,035 cycle tubes; 251,124 pairs of rubber and rubber-soled shoes, valued at 496,000 rupees. In addition various other rubber imports were valued altogether at 210,000 rupees.

[1] Rupee equals 20.87¢ U. S. currency.

Studies of Relaxation Characteristics of Non-Metallic Gasket Materials[1]

R. G. Farnam[2]

RELAXATION in gasket materials has long been recognized. Though studies have been made of this characteristic, its acceptance as a specification requirement in industry is not yet generally adopted. This paper describes a relatively simple apparatus designed for determining the relaxation characteristics of gasket materials at room and elevated temperatures to simulate actual field conditions. Relaxation characteristics of representative gasket materials chosen from several commonly used types tested under various loads, temperatures, and times, including reloadings, are presented in graphic form.

These studies, relating to actual field conditions of gasket applications, indicate the close relation between the relaxation characteristics of gasket materials and their engineering performance. Since many failures of performance may reasonably be attributed to the specific relaxation characteristics of the gasket materials, these studies would offer a more realistic and direct method and approach for the evaluation of these gasket materials and for obtaining more accurate and reliable indications of their advantageous applications.

Non-metallic gaskets, when subjected to flange pressure, all have some degree of "let-down" after the original tightening of the flange bolts.

This characteristic, which the author has tentatively termed relaxation, is quite familiar to everyone having an intimate knowledge of these materials. It is not only a common cause of gasket leaks, but of many gasket failures. Without particular reference to types or causes of relaxation, it was felt that a very definite need existed of determining the extent of this property in gasket materials. The presently used test methods, such as those for determining compression, recuperation, and compression set, although valuable in evaluating gasket materials, do not indicate what will happen to these materials under flange pressure in respect to what is required to maintain a seal.

Studies of relaxation characteristics in gasket materials are not new. Considerable knowledge concerning the subject of relaxation is already available.[3] The importance of relaxation, however, in respect to avaluating gasket materials has not been generally accepted by industry.

The purpose of this paper is to describe an apparatus designed to measure the extent of relaxation of nonmetallic gasket materials under conditions by which variables such as heating and cooling cycles, flange pressure, retorquing, humidity, etc., which ordinarily occur under field conditions, may be controlled.

It is also the purpose of this paper to describe relaxation studies conducted on a number of commonly used types of gasket materials under various loads, at various temperatures, and for various time cycles. The studies also include reapplication of the original load on the specimen after prescribed periods during which relaxation was allowed to occur.

The data accumulated in these studies will be drawn upon to explain the possibilities of utilizing relaxation measurements as a more scientific guide for evaluating gasket materials.

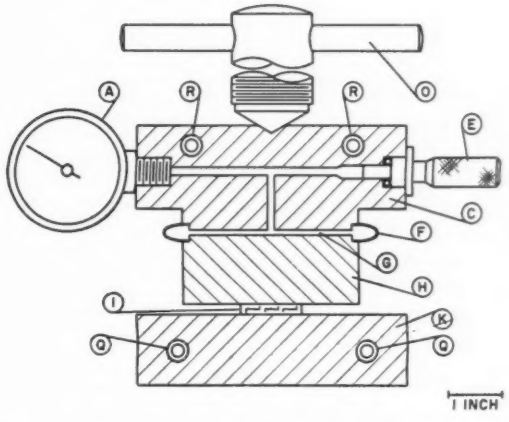


Fig. 1. Diagrammatical Drawing of Relaxometer Showing Basic Design Features

Description of Relaxometer

Figure 1 is a diagrammatical drawing of the apparatus. It has been named the Relaxometer and was designed and built for the author by James D. Cole, of Cole Electric Co., Park Ridge, Ill.

The approximate size of the instrument can be noted from the scale on the drawing.

The instrument was designed around a sealed hydraulic system and a bourdon tube-type gage.

A thin disk-like chamber (*G*) is provided between two rigid metal pieces (*C* and *H*). The top block (*C*) and the piston (*H*) are connected together with a flexible metal bellows (*F*) brazed in place. The bottom and top blocks (*K* and *C*) are alined with dowel pins (not shown) which allow the top block (*C*) to move up and down freely.

The hydraulic system after evacuation is filled with a fluid of high boiling point and low thermal expansion characteristics.

A specimen of gasket material (*I*) is placed under the piston (*H*), and pressure is applied on the top block (*C*) by means of a jack screw (*O*). The pressure on the top block (*C*) is exerted through the hydraulic system

[1] Presented before the Rubber & Plastics Division, ASME, New York, N. Y., Dec. 1, 1950.

[2] F. D. Farnam Co., 4940 W. Flournoy St., Chicago 44, Ill.

[3] "Compression and Stress-Decay in Rubber Gaskets," F. C. Thorn. Presented at meeting of Subcommittee VI on Packings, Committee D-11 on Rubber Products, June 25, 1944, at annual meeting of American Society for Testing Materials, Chicago, Ill.

Report to Subcommittee VI, ASTM Committee D-11, by C. K. Chatten, June 28, 1950.

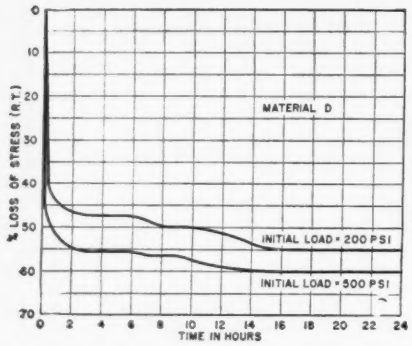


Fig. 2. Relaxation Characteristic Curves of Glue-Glycerine Treated Plant Fiber Sheet Packing at Room Temperature under 200 and 500 PSI. Initial Loads

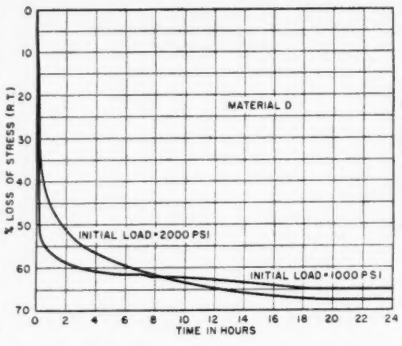


Fig. 3. Relaxation Characteristic Curves of Glue-Glycerine Treated Plant Fiber Sheet Packing at Room Temperature under 1,000 and 2,000 PSI. Initial Loads

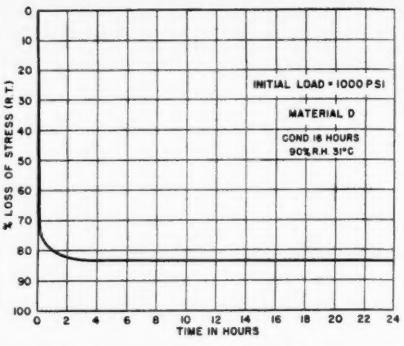


Fig. 4. Relaxation Characteristic Curve of Glue-Glycerine Plant Fiber Sheet Packing at Room Temperature under 1,000 PSI. Initial Load Wherein Material Has Been Conditioned under Controlled Humidity

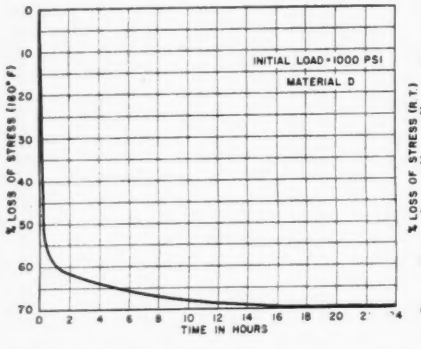


Fig. 5. Relaxation Characteristic Curve of Glue-Glycerine Treated Plant Fiber Sheet Packing at 160° F. under 1,000 PSI. Initial Load

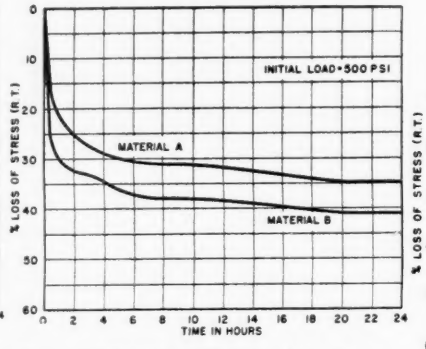


Fig. 6. Relaxation Characteristic Curves of Two Types of Asbestos Compressed Sheet Packings at Room Temperature under 500 PSI. Initial Load

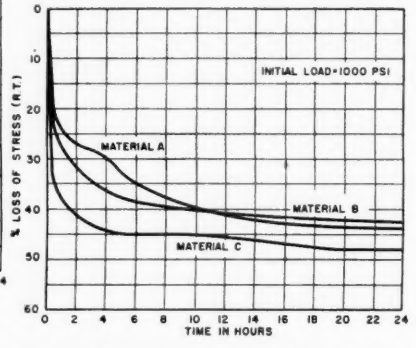
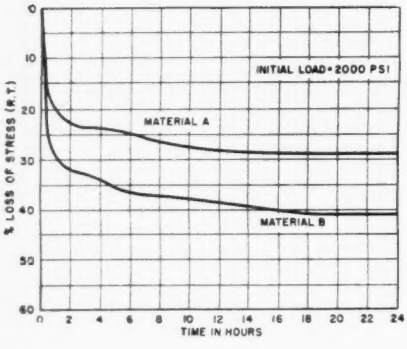


Fig. 7. Relaxation Characteristic Curves of Three Types of Asbestos Compressed Sheet Packings at Room Temperature under 1,000 PSI. Initial Load

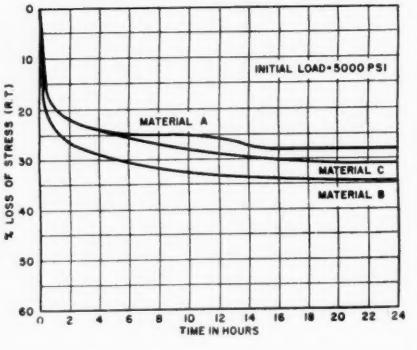


(Left)

Fig. 8. Relaxation Characteristic Curves of Two Types of Asbestos Compressed Sheet Packing at Room Temperature under 2,000 PSI. Initial Load

(Right)

Fig. 9. Relaxation Characteristic Curves of Three Types of Asbestos Compressed Sheet Packing at Room Temperature under 5,000 PSI. Initial Load



and the piston against the gasket material and is indicated by the gage (*A*).

A very slight fluid displacement takes place during compression owing to fluid traveling from the hydraulic chamber (*G*) to the bourdon tube. Hence the thickness of the hydraulic chamber has been slightly reduced. With the piston in direct contact with the bottom block (*K*), the thickness of the hydraulic chamber is reduced 0.0003-inch at 10,000 psi. pressure from what it was at 0 pressure. This very slight reduction in the thickness of the hydraulic chamber is accomplished by providing a large piston area in relation to the volume of fluid displaced. It is believed that an error of this magnitude is insignificant in respect to the commercial variation in samples of the same materials; however, it can be compensated for completely. A micrometer screw (*E*) is mounted in communication with the fluid in the hydraulic chamber (*G*). This micrometer is sealed with a rubber O-ring. For tests requiring the ultimate in accuracy, the micrometer can be used to compensate for the hydraulic chamber thickness error. For each 1,000 psi. difference in gage reading, the hydraulic chamber thickness change is 30 by 10^{-6} inches. The micrometer can be used to transfer fluid back into the hydraulic chamber (*G*) to restore it to exactly the same thickness it was under zero load. This compensation amounts to 0.0059-inch on the micrometer used in the instrument per 1,000 psi. pressure.

For tests requiring temperature cycling, electric heating elements (*R*), (*R*), and (*Q*), (*Q*), are located in the top block (*C*), and the bottom block (*K*). These elements are controlled by individual thermostats (not

shown). Temperature measurement is indicated by thermocouple-type thermometers (not shown) inserted in low block (K) and piston (H).

Since it is not possible to secure a suitable hydraulic fluid without some volume change due to temperature variations, the micrometer screw (E) also provides the means for maintaining the original thickness of the hydraulic chamber (G). Thus compensation is made for the thermal effects on the fluid. In the apparatus used for these tests a 0.003-inch micrometer screw movement is required per °F. The accuracy of the results obtained, of course, is predicated on the accuracy of the gage (A).

Any convenient method of applying pressure or loading can be used, as long as the time of loading can be uniformly controlled.

Materials Tested and Results

The gasket materials selected and tested for this discussion follow:

Material A: Neoprene Rubber Bonded Asbestos Compressed Sheet Packing.

Material B: GR-S Bonded Asbestos Compressed Sheet Packing.

Material C: GR-S Bonded Asbestos Compressed Sheet Packing. (This material has somewhat different characteristics than Material B, which are explained below).

Material D: Glue-Glycerine Treated Plant Fiber Sheet Packing.

All material specimens tested were die cut into disks 0.901 square inch in area (equal to 1/10 the area of the piston) and were a nominal 1/16-inch in thickness. The dates of manufacture of the materials tested were recorded on all test specimens. Material D was conditioned in an electric circulating oven for 24 hours at 120° F. immediately preceding each test, with the exception of one sample. The special conditioning of this particular sample is noted in the following discussion. Materials A, B, and C were not conditioned.

Three tests were conducted on each type of material, and the average was recorded on the accompanying graphs. The loading for each test was applied uniformly over a 10-second period. Recordings were made at very short intervals for the first two hours of each test. This was followed by recordings made at longer intervals ranging from one hour to four hours.

The extent of the relaxation of the materials discussed herein has been expressed as per cent. loss of stress determined by the following equation:

$$\frac{\text{Initial Load (psi.)} - \text{Remaining Load (psi.)}}{\text{Initial Load (psi.)}} \times 100 = \%\ \text{Loss of Stress}$$

(The psi. referred to herein is the actual psi. exerted on the specimen.)

Material D, whose relaxation characteristics are presented graphically in Figures 2, 3, 4, and 5, is a commonly used type of plant fiber sheet packing. This material has been treated with glycerine plasticized glue which is, in turn, reacted with formaldehyde. This material meets ASTM Tentative Specifications G-3213. It is widely used in the automotive industry on such applications as gear-case cover gaskets, transmission-case cover gaskets, gas cap gaskets, carburetor bowl gaskets, and the like.

Figures 2 and 3 indicate the per cent. loss of stress at room temperature of Material D after applying initial loads of 200, 500, 1,000, and 2,000 psi. respectively. It will be noted that the per cent. loss of stress increases as the initial load increases, within the range of initial loads applied.

The curves indicating the per cent. loss of stress at 200, 500, and 1,000 psi. initial load fall into the same family. The curve showing the per cent. loss of stress at 2,000 psi. initial load, however, deviates considerably. This deviation of slope seems to indicate the material has been subjected to excessive packing action, which substantially alters its structure. It will be noted that within one-half hour the actual loss of stress in psi. resulting from an initial load of 2,000 psi. already exceeds that caused by an initial load of 1,000 psi. after 24 hours. These curves seem to bear a direct relation with field experience. Numerous failures of gaskets made from Material D occurred when the flange loads greatly exceeded 1,000 psi.

Figure 4 shows the relaxation characteristics of Material D after conditioning in a humidity cabinet for 16 hours at 31° C. and 90% relative humidity. As this material is very sensitive to humidity, its absorption of moisture causes a 75% loss of stress within five minutes. Relaxation characteristics of Material D shown in Figure 4 may be correlated exactly with field experience with this material exposed to warm humid atmosphere.

Figure 5 shows the per cent. loss of stress of Material D at 160° F. with an initial load of 1,000 psi. After about 20 minutes the rate of relaxation appears to be much more rapid than that at room temperature, indicating that the effect of elevated temperatures on this material seems to promote more rapid and greater relaxation.

Figures 6, 7, 8, and 9 show the relaxation curves of Materials A, B, and C at room temperature when under initial loads of 500, 1,000, 2,000, and 5,000 psi. respectively.

Material A is a type of Neoprene Rubber Bonded Asbestos Compressed Sheet Packing meeting Specifications SAE AMS-3232-E, as well as ASTM Proposed Specifications G-1123. This material is used extensively in the diesel engine field and the aeronautical field owing principally to its high resistance to lubricating oils, fuel oils, water, heat, and gasoline.

Material B is a GR-S Type Rubber Bonded Asbestos Compressed Sheet Packing meeting ASTM Proposed Specifications G-1111-2. It is used as a general-purpose, low-cost gasketing material on applications such as carburetor flanges, water pumps, automotive differential housings, low-pressure pipe lines, etc.

Material C is also a GR-S Type Rubber Bonded Asbestos. Compressed Sheet Packing meeting ASTM Proposed Specifications G-1111-2 and Navy Specifications 33-P-13. This material has longer asbestos fibers, higher rubber content, and higher tensile strength than Material B. Its usage is also wider.

Material A seems to show more desirable relaxation characteristics from all tests conducted, with the exception of results shown in Figures 7 and 10, bearing further investigation.

It will be noted that the per cent. loss of stress of Material C is higher than that of Material B at an initial load of 1,000 psi. (Figure 7), but less than Material B at an initial load of 5,000 psi. (Figure 9).

While the higher rubber content in Material C may cause the high per cent. loss of stress at an initial load of 1,000 psi., the longer asbestos fibers in this material may be responsible for the lower per cent. loss of stress at an initial load of 5,000 psi., owing probably to the

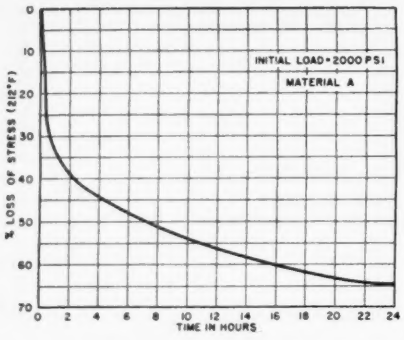


Fig. 10. Relaxation Characteristic Curve of Neoprene Rubber Bonded Asbestos Compressed Sheet Packing at 212° F. under 2,000 PSI. Initial Load

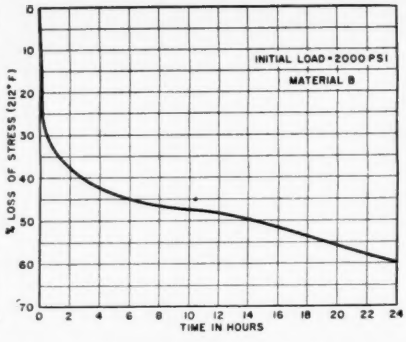


Fig. 11. Relaxation Characteristic Curve of GR-S Bonded Asbestos Compressed Sheet Packing at 212° F. under 2,000 PSI. Initial Load

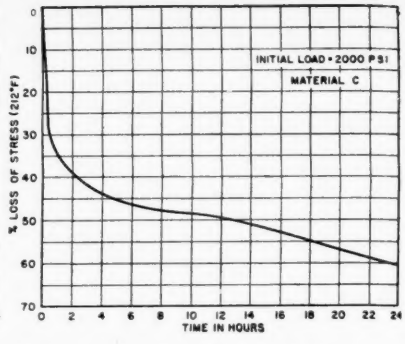


Fig. 12. Relaxation Characteristic Curve of Another GR-S Bonded Asbestos Compressed Sheet Packing at 212° F. under 2,000 PSI. Initial Load

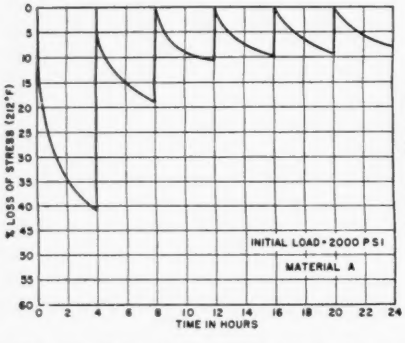


Fig. 13. Relaxation Characteristic Curve of Neoprene Rubber Bonded Asbestos Compressed Sheet Packing at 212° F. under 2,000 PSI. Initial Load Showing Effect of the Reapplication of the Initial Load after Material Had Been Allowed to Relax for a Period of Four Hours

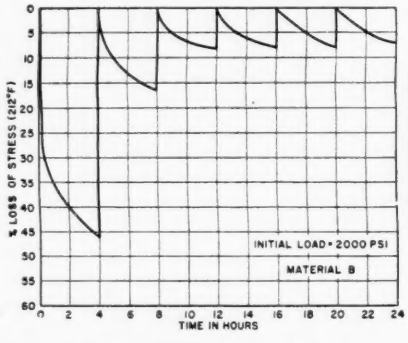


Fig. 14. Relaxation Characteristic Curve at GR-S Bonded Asbestos Compressed Sheet Packing at 212° F. under 2,000 PSI. Initial Load Showing Effect of the Reapplication of the Initial Load after Material Had Been Allowed to Relax for a Period of Four Hours

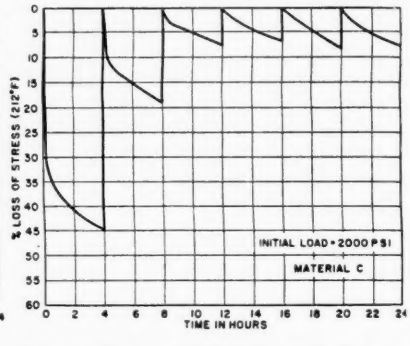


Fig. 15. Relaxation Characteristic Curve of Another GR-S Asbestos Compressed Sheet Packing at 212° F. under 2,000 PSI. Initial Load Showing Effect of the Reapplication of the Initial Load after Material Had Been Allowed to Relax for a Period of Four Hours

tight packing of these long fibers under such a load.

The fact that these three materials contain a high percentage of asbestos which is crystalline and dense in nature may be responsible for the per cent. loss of stress not being more than 48%.

The curves shown in Figures 6, 7, 8, and 9 appear to indicate that each type of asbestos compressed sheet packing (Materials A, B, and C) has relaxation characteristics common to each individual material. The per cent. loss of stress reaches a maximum at an initial load of 1,000 psi. within the range of the loads applied.

Figures 10, 11, and 12 show the per cent. loss of stress for Materials A, B, and C at 212° F. under an initial load of 2,000 psi. In comparing these curves with those in Figure 8, it is noted that they do not level off within the 24-hour period. Moreover the per cent. loss of stress at 212° F. is more drastic than that at room temperature. This point clearly shows that elevated temperature promotes the extent of relaxation.

In comparing Figures 11 and 12, the curves are almost identical, except Figure 12 shows a per cent. loss of stress that is slightly higher than that of Figure 11. This slight difference of stress loss is consistent within the range two to 24 hours. It is believed that this slight difference is primarily due to higher rubber content in Material C.

Figures 13, 14, and 15 show the effect of reapplying the initial load after the specimen has relaxed for a given period of time.

The figures are self-explanatory and indicate that relaxation could be used to study the effect of retorquing bolted flanges. The interval between reapplying the initial load was arbitrarily chosen. It was felt, however, that four hours would be adequate to produce significant relaxation.

Were these particular curves to be used as a guide to determine the retorquing requirements of a bolted flange, it appears that three retorquings would be the maximum required.

Discussion

The curves discussed in Figures 2 to 15 inclusive were selected from a larger group in order to show by actual example what valuable information may be acquired from data obtained from the Relaxometer. Further studies will be made of all data as they are accumulated. By replotting these described curves on log or semi-log paper, rather than rectilinearly, indications are that more interesting and valuable information can be obtained. The versatility of the Relaxometer renders an unlimited field of study wherein the material can be subjected to variations of the conditions discussed in this paper.

Another important feature of the apparatus is that it can be used to test the relaxation characteristics of parts or all of gaskets already cut, with particular refer-

(Continued on page 685)

RMA Packing Specifications for Crude Rubber Should Be Made More Specific

C. B. McKeown[1] and T. E. Williams[2]

INDIA RUBBER WORLD has actively supported and campaigned, particularly during the past two or three years, for improvement in the packaging and the handling of crude natural rubber as well as the establishment of technical specifications for such rubber. The accompanying article seems to indicate that such progress as has been made in handling, bale marking, and coating is still far from adequate. Further improvement in the January 1, 1951, packing specifications of The Rubber Manufacturers Association, Inc., is needed, and since the General Services Administration is now the sole buyer of crude natural rubber for the United States, an excellent opportunity for improving the condition and the quality of such rubber received in this country should not be overlooked. EDITOR.

THE latest packaging specifications of The Rubber Manufacturers Association, Inc., effective January 1, 1951, are not explicit enough to deter or prevent certain undesirable practices frequently followed in packaging and labeling natural rubber. It is anticipated that excessive talc, inadequate identification marks, and objectionable bale coatings will continue to be found in numerous lots of rubber packed under these specifications. This situation is unlikely to improve until such time as RMA packing specifications are changed to define definitely such rubber as improper tenders.

Excessive Talc in Bales

The 1938 RMA packing specifications permitted the use of a maximum of ¾-pound of talc per package for *dusting* purposes to prevent adhesion of rubber to foreign packaging materials and to prevent sticking of rubber wrapper sheets to the rest of the bale. Dusting was permissible, but not mandatory between bale sections. No significant change has been made in this specification to date except to define the minimum quality of talc for use in packaging operations.

The evidence indicates that some packers frequently ignore the intent and the purpose of the 1938 dusting specification. When the price of rubber is relatively high, such packers apparently seize upon the ¾-pound talc limitation as an excuse to use excess quantities of talc at one or more places within each bale. These packers probably feel secure in the knowledge that it is most always difficult to prove at a place of inspection that the presence of talc in excess of ¾-pound per bale actually exists, even though considerably more than this quantity may have been used.

Not infrequently sample bales are split open for inspection with the result that loose talc spills out on the floor. Bales from other lots sometimes contain pockets of talc in such quantity that handsful can be scooped up. It appears obvious that all the talc in such lots was not placed there for dusting purposes.

Shippers' agents, nevertheless, generally claim it is necessary to prove an overall average talc weight in excess of ¾-pound of talc per bale in a random 10% sampling of bales before an objection can be considered. Unfortunately, trade arbiters authorized to settle such disputes have, with no known exceptions, sustained this interpretation of the talc specification.

As a result, it has become trade custom in disputes concerning excessive talc to have 10% of the bales pulled apart, and all loose talc shaken out. If an average loss in weight in excess of ¾-pound per bale is thus determined, arbiters usually fix an allowance based solely on the weight aspects of the case and apparently give little thought to the quality considerations so important to consumers.

In recent years no such lots have been ruled "nonbonafide" by trade arbitration. If the average loss in weight upon detalcing of a disputed lot does not exceed ¾-pound per bale, the lot is ruled "proper tender" even though some bales thus partially detalced may lose more than a pound per bale.

On the pier, where most such disputes must be settled, it is practically impossible to determine the weight of the talc which clings to the rubber after shaking, or the weight of talc in bale coatings. Thus these aspects have been given little consideration. Under present trade practice it is extremely unlikely that a rejection or an allowance claim for excessive talc can be supported during the three to five winter months at eastern ports during which arrivals are frozen solid. The cost of labor to "detalc" frozen lots is prohibitive.

The RMA packing specifications, as interpreted through trade practice, therefore, do not provide a suitable basis for necessary control of the amount of talc used in packaging crude natural rubber. When a manufacturer-consumer buys rubber, he does not care to receive, for obvious economical and quality reasons, more than the minimum talc necessary to prevent adhesion of wrapper sheets to each bale and between bales during shipment. Nor does he care to use labor unnecessarily to remove the adulterant. Unless removed, the excess talc found in many bales of rubber may cause expensive rejections of semi-processed or finished goods, especially where lightly loaded or pure gum-type compounds are used.

Actually, talc serves no purpose, nor should its use be permitted *within* a bale except to prevent rubber wrapper sheets from adhering to the bale proper. A few ounces of talc are ample for this requirement, and this point should be reemphasized in any revised packing specification.

In contrast, when no talc at all is used between bale and wrapper, it is frequently necessary to strip or cut dirt or dunnage embedded rubber wrapper sheets from bareback bales; which step is now extremely costly be-

[1] The B. F. Goodrich Co., Akron, O.
[2] The B. F. Goodrich Co., New York, N. Y.

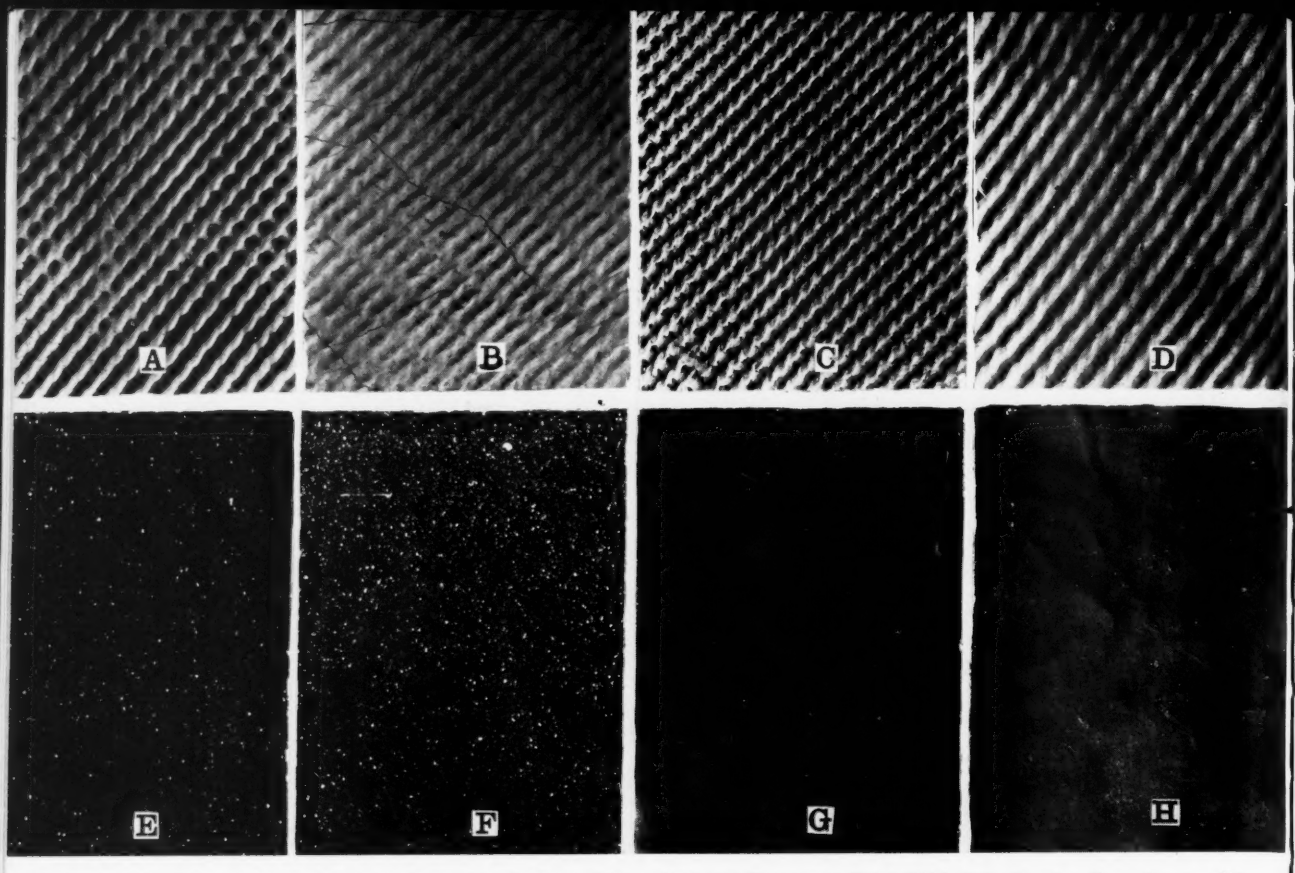


Fig. 1. Examples of the Effect of Old (Bone Glue-Talc) and New (Mineral Turpentine-Talc) RMA Bale Coating Formulae on #1 RSS, Both before and after Mastication. Left to Right: *A*—Light Bone Glue-Talc Coating; *B*—Heavy Bone Glue-Talc Coating; *C*—Light Mineral Turpentine-Talc Coating; *D*—Heavy Mineral Turpentine-Talc Coating; *E*—*A* after Mastication (Note Specks); *F*—*B* after Mastication (Note Specks); *G*—*C* after Mastication; *H*—*D* after Mastication

cause most packers do not talc the inside of rubber wrapper sheets. Such untalced wrappers become firmly adhered to or homogeneous with the remaining rubber in the bale.

Actually no technical reason exists for using talc within a bale except between wrapper and bale proper. Relatively few packers have exercised the option, given in the 1938 specification, which *permits* dusting between bale sections. This practice has resulted through the years in few, if any, complaints being registered with rubber associations because talc was *not* used to dust between bale sections.

Unless the 1938 specifications permitting the use of ¾-pound per bale of talc and the dusting between bale sections are definitely cancelled, a few packers will likely continue to load talc into their bales since the 1951 specifications do not cancel or even mention this provision. A revised specification should positively state that the presence of talc within a bale, except where stipulated, is evidence of improper tender. The presence of loose talc, unadhered to wrapper or bale and in excess of small nominal amounts, should likewise be listed as cause for rejection.

Identical Bale Markings

Certain Far Eastern shippers, notably the Siamese, are using totally inadequate bale markings, thus making it impossible for steamship companies to sort rubber according to separate ocean bills of lading upon discharge.

During the past year it has been noted that every large shipload of Siamese rubber received into the U.S.A. contained thousands of bales of rubber marked only with the shipper's identification marks, a letter or geometrical grade symbol, and the country of origin. No lot identification marks or range numbers of any kind were on the bales to make possible the segregation by bill of lading lot upon discharge from the steamer. Thus it is difficult, if not impossible, to establish positive ownership of any given pile of such rubber on the pier since several other piles bear identical markings.

It is granted that no harm would be done if all the lots of identically marked bales were of equal weight, quality, and condition, but such is seldom the case. Some piles of identically marked bales taken from a certain location in the ship may be in good condition and may conform to prescribed weight and quality standards. Other piles taken from other locations in the ship may be badly crushed or water damaged, may be off weight several pounds per bale, and/or may be a full grade or more off quality.

Under such circumstances it is pure concidence if any buyer actually receives delivery of the particular parcel of identically marked rubber which was examined and test weighed for his account unless he arranges to have his lot countermarked and set aside immediately after examination. Otherwise it seems customary for steamship companies to deliver identically marked lots, as the various delivery orders are presented, from the most accessible piles of such rubber on the pier. Apparently loaders neither know nor care which of the various piles were examined or weighed for each buyer.

Under these conditions manufacturer-consumers lose desired control over quality of finished products. Rubber dealers can frequently find themselves in difficulty with buyers who receive badly distorted or damaged bales

reported by inspectors to be sound. Weight arguments arise because the rubber test weighed for a particular delivery was not the rubber actually delivered. Yet the RMA packing specifications are not violated in any respect by the practice of using identical bale markings which results in these serious problems.

Except for obliteration due to poor marking solutions or bale coatings the problem of lot identification has been eliminated with respect to Malayan shipments. The Singapore Chamber of Commerce Rubber Association in its Circular No. 3 of 1950, published the Far Eastern Freight Conference Rubber Rules—Appendix B under date of the 18th, January, 1950. These rules carefullly define color, size, order, and location of bale markings and require that a bill of lading lot identification number be placed on each bale. To alleviate current marking difficulties it seems that the Rubber Manufacturers Association should incorporate similar requirements into its packing specifications.

Objectionable Bale Coatings

It is estimated that 40 to 50% of the smoked sheets presently shipped from Malaya consist of bales coated with a talc solution in which animal bone glue is used as a binder. J. C. Roberts earlier very ably presented the background of the bareback bale coating problem.[3] He pointed out that the widely used glue-talc coating solution did not form a satisfactory base for holding shipment marks or did it successfully prevent adhesion between bales.

The major objection to the bone glue-talc solution, however, is the fact that it becomes very hard and gritty. Unless applied very lightly, it forms a hard shell over the bale, part of which flakes off in transit, and thus renders shipment marks illegible. Enough of the shell clings tenaciously to the rubber, however, to cause the consumer a difficult and expensive removal operation.

Caked coating materials of this kind must be removed from the bales before processing because it is practically impossible to break down such coating to passable particle size by any usual methods of rubber mastication. (See Figure 1.) Only products which can tolerate an equal quantity of fairly coarse sand without impairment can be successfully manufactured out of bone glue-talc coated rubber.

Unfortunately one of the earlier RMA temporary packing specifications listed the complete recipe for preparing the bone glue-talc solution and recommended that it be used. When manufacturers began to complain, a new temporary packing specification was issued omitting the bone glue-talc formula, but not cancelling or forbidding it. Consequently the many shippers who had adopted the formula continue to use it and apparently intend to do so until it is definitely outlawed by the RMA.

In the above-mentioned article Mr. Roberts discussed the development of a very satisfactory bale coating formula which has been published, but not made mandatory, in more recent RMA temporary packing specifications. Yet despite the fact that this formula was circulated to all Far Eastern producer associations early in 1950, evidence indicates that relatively few packers have started using it.

Present RMA packing specifications, besides giving the newly recommended bale coating formula, state that talc coating solutions applied to bareback bales must "easily disperse upon mastication" and "must have no adverse effect upon the quality of manufactured products." But how is a packer to know how thick to apply a coating material, which though once specified has never been completely satisfactory, so that it will accomplish its purpose and yet not have adverse effects? (See Figure 1.) With this question in mind arbiters who have considered disputes concerning objectionable coatings have consistently avoided awarding other than token penalties or else have declared the disputed lots to be proper tender. Arbiters correctly point out that it is difficult to determine by visual inspection whether or not a particular coating will have any adverse effects on finished products.

Very few available arbiters on the rubber association panels have had any factory processing experience; thus a question of this kind cannot be satisfactorily considered by usual trade rules and practice. Yet no other means exists to settle such disputes without going into the heavy expense of importing out-of-town factory experts or making actual laboratory dispersion tests.

If the RMA prohibits the bone glue-talc formula completely, arbiters could have a quick analysis made of a disputed coating material. If the presence of glue were established, the arbiters would have a sound basis on which to declare the disputed lot non-bonafide or to award a penalty allowance sufficient to cover reconditioning costs. One or two such penalties would probably effectively stop the use of the bone glue-talc formula.

Conclusions

Everyone interested in the production, trade, shipment, and consumption of natural rubber would benefit by a more exacting set of RMA packing specifications with respect to the use of talc, shipment marks, and bale coatings. The producer-exporter interests, by complying with such specifications, would develop a more favorable comparison of their packing with that of American synthetic rubber producers. Steamship, rail, and truck companies as well as underwriters would be saved considerable sums now expended on extra labor and claims settlements.[4] Rubber dealers would be able to avoid going "out of pocket" in many instances on the claims allowed buyers which cannot now be recovered through trade practice under existing specifications. Finally, the manufacturer-consumers would receive a more acceptable raw material in a more acceptable condition.

[3] "A Means for Improving the Packaging of Natural Rubber," India Rubber World, Mar., 1950, p. 678.
[4] *Ibid.*, July, 1948, p. 521.

Relaxation Characteristics

(*Continued from page 682*)

ence to narrow-flanged gaskets—extremely large quantities of which are used in the automotive field.

This apparatus, being a first model, is eligible for some improvements. It is believed, however, that it is basically a practical instrument for the determination of the extent of relaxation. It simplicity and small size are two important features.

Although several individual tests are summarized herein, considerable work remains to be accomplished. It was felt, however, that the results obtained so far were sufficient to present at this time in hopes that this presentation would invite discussion and further encourage others to carry on similar studies in the prime interest of establishing relaxation as part of a standard specification for these-type materials.

Editorials

What *Is* the National and World Rubber Situation?

THE rubber situation in the United States, since the government took over the exclusive buying of natural rubber and intensified its efforts to restrict the consumption of both natural and synthetic rubber for civilian goods around the first of the year, has become increasingly complex and confused. Similarly, the world situation with regard to natural rubber supply, demand, and price has been confused for the past several months.

In the United States we must accept the fact that if we are to have a major defense effort and exist in a state of national emergency for a considerable period of time, there will be dislocations in our national economy, but, the question naturally arises, do these dislocations, particularly in the rubber industry, have to be so severe while the world is not actually involved in a full-scale war?

The world natural rubber picture during most of 1950, without exclusive government buying by the United States, was bad enough; with such buying the price has not dropped, as expected, and the amount of natural rubber available to this country seems less than before. Obviously, there must be some unusual factors influencing the world market, and, possibly, a world market half free and half controlled may be impractical of successful operation.

Apparently the British Government feels that the unusual conditions existing in world rubber markets today require immediate investigation since an intergovernmental rubber conference was called suddenly in London on February 5. The conference was unusual in that it was not associated with the International Rubber Study Group, and representatives of producers, consumers, and the trade were not invited; the attendance was confined to government officials from Ceylon, Indonesia, Thailand, Indo-China, Canada, France, Italy, the Netherlands, and the United States.

Although the official announcement of the conference stated that its purpose was "to review the supply and demand of natural and synthetic rubber for this year and 1952, and consider what action, if any, is necessary or desirable to secure an equitable distribution of the supplies which are expected to be available," means of restricting shipments of natural rubber to countries in the Communist bloc and the future price level of natural rubber were considered to be specific major factors which caused the conference to be called.

Reports from London in mid-February indicated that the British Government was taking the position that shipments of natural rubber to the Communist countries in Asia were not abnormal. The January, 1951, issue of the *Rubber Statistical Bulletin*, published by the Secretariat of the Rubber Study Group in London, however, shows that China received 16,482 tons of rubber from Malaya in November and December, 1950, as compared with only 10,025 tons received from that source for the first three quarters of 1950 and only 6,990 tons for the entire year 1949. Hong Kong, although not in the Communist bloc, is a port of transshipment and received 12,746 tons from Malaya in November and December, 1950, in contrast to 19,752 tons during the first three quarters of that year. Hong Kong imports of rubber in 1949 totaled 23,287 tons. Prior to World War II, imports into China and Hong Kong amounted to only about 5,000 and 2,500 tons annually from all sources.

The basic reason why the amount of natural rubber available to the United States during the last two or three years has declined, while the price has increased, is the heavier than normal buying everywhere outside the United States, which has been on the upward trend since 1948. The February, 1951, issue of *Natural Rubber News* estimates that while world production of natural rubber was 1,525,000 tons in 1948, 1,488,000 tons in 1949, and 1,830,000 tons in 1950, absorption outside the United States was 790,000, 827,000, and 1,025,000 for the three years mentioned.

Although information on the results of the London rubber conference toward the end of February could not be classified as much better than informed guessing, it seemed to be stalemated on the matter of an American guaranteed price for natural rubber over a long-term period.

It can only be concluded, therefore, that if the United States Government persists in its plan to amass a stockpile of natural rubber by exclusive buying in excess of the country's foreseeable needs even in the event of another world war of five or more years' duration, it will do so at an excessive price and at a rather slow rate.

The tire branch of the rubber goods industry in the United States, in its report of October 24, 1950, entitled "Analysis of the 1951 Rubber Problem," which was prepared for government agencies responsible for rubber, recommended a program including increased production of GR-S and Butyl rubber and natural rubber stockpiling at a rate of about 30,000 tons a month during 1951 as adequate for assuring total rubber security "without economic chaos."

As soon as the details of the London rubber conference become known, a review of United States Government policy on stockpiling and exclusive buying of natural rubber as related to civilian rubber goods production would seem to be badly needed.

P. G. Seaman

DEPARTMENT OF
PLASTICS TECHNOLOGY

Proven Techniques for Dry Coloring Thermoplastics

Sanford E. Glick[1]

WHEN Monsanto first began to encourage polystyrene molders to employ the dry coloring technique, it was felt that the field of application was fairly limited. As molders became proficient in this method and as improvements were developed, it soon became obvious that the original limitations no longer applied. It is now believed that at least three out of every five colored styrene items can be satisfactorily produced by dry coloring.

Even with the limited experience to date it has been possible successfully to dry color industrial parts such as wall tile, television masks, vacuum cleaner parts, utensil handles, thermometer housings, various containers, clock cases, and electric cord plugs. Refrigerator parts are also being considered for this method of coloring, and its use in housewares, toys, and novelties continues at an ever-increasing pace. As the skill and science of dry coloring progresses, it is believed that its use will be extended to applications where only processed colors have heretofore been considered. The reception which this technique has elicited from molders has been remarkable.

The chief advantages of dry coloring are simplicity, economy, and efficiency of operation; reduced inventory requirements for the molder; exceptionally bright and lustrous colors in the molded item because of no degradation during processing; adaptability to scrap redyeing and reworking; and the possibility of opening new fields for colored plastic applications by means of lower costs. Its present limitations are lack of the high fidelity and complete freedom from color streaks required for some applications where exact color matching is critical. These limitations may soon be overcome with accelerating research and the development of new techniques.

Dry Coloring of Vinyls and Polyethylene

Forerunner of styrene dry coloring was the dry coloring of vinyls, particularly in the extrusion of wire covering and profile shapes. Approximately 75% of all extruded vinyls are made with a dry coloring method. Two techniques of coloring are currently employed: one consists of blending the compound with the dry colorants, and the other involves the use of a color pill or concentrate produced from a masterbatch. With the dry pigment a savings of 3½-5½¢ a pound is realized, while the color concentrate method gives a savings of 2½-4½¢ a pound.

Dry blending is also becoming increasingly popular for the injection molding of

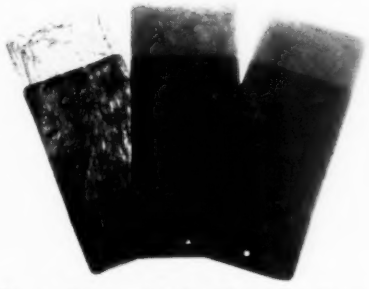


Fig. 1. Degree of Color Dispersion Shown by Three Color Chips Made with (L. to R.) Pelleted Crystal, Medium Crystal, and Lustrex Colorant Blend

vinyls. Here, in addition to the colorant, plasticizers, stabilizers, and lubricants are added to the vinyl resin in a muller-type mixer. Suitable blending is obtained in as little as four minutes, and the blended material can then be molded directly. Some of the advantages derived from this method include low material inventory, simplified color matching in a wide range, fast processing schedules, and reduced cost of raw material. Vinyl processors need no longer depend on suppliers of compounded materials or on slow mixing and granulating processes in their own plants.

Polyethylene has also been successfully dry blended in a wide range of colors for numerous household and industrial applications. Practically the same techniques are used for polyethylene as for styrene, and the advantages obtained by dry coloring of styrene and vinyls also apply to polyethylene.

Dry Coloring of Polystyrene

The equipment needed for coloring styrene crystal by dry blending does not require a large investment. The process requires only the simple mixing of raw colorants with crystal styrene by dry tumbling. The resulting mixture is then molded directly. There is no intermediate step of compounding with either a roll mill or an extruder, such as is performed in the manufacture of materials for processed colors.

The dry coloring process consists of the following steps:

(1) Charge 50-150 pounds of suitable crystal styrene into a clean 55-gallon tumbler or comparable mixer.

(2) Add the accurately weighed colorant to the crystal. Desired quantities of colorant may be weighed out in advance and stored in glass jars or other suitable containers. Some colorants may lump upon handling and, therefore, should be screened immediately prior to blending.

(3) Tumble the mixture at 30-45 rpm. for 5-20 minutes. Variations in length of tumbling or blending time are sometimes required, as discussed in a later section.

(4) Remove the colored molding powder from the blender, transfer to an injection machine, and mold directly.

MATERIAL REQUIRED. When styrene plastic was first dry colored, all types of crystal were employed since no attention had been given to the development of a special crystal for this application. Pellets or large granules without special lubrication were utilized and, as a result, poor coloring was obtained. Some of the difficulties encountered included severe dusting and subsequent contamination of dyestuffs because of no surface treatment of the crystal particles; poor color dispersion because of the large crystal particles size; and poor color stability because of improper colorants. With the introduction of suitable crystal styrene molding powder and the selection of proper colorants these difficulties no longer prevail.

To meet the need of a suitable crystal styrene for dry coloring, Monsanto has developed a material especially designed for this purpose, designated as Lustrex LJ020 Pix-6 Colorant Blend. This material is of such a particle size as to give optimum color dispersion and distribution (see Figure 1). Best distribution of color is obtained with a small granular crystal of uniform particle size which has been surface treated. Because of the high surface-to-weight ratio of Lustrex Colorant Blend crystal, better color distribution is obtained than with standard granulated or pelleted styrene crystal.

The surface treatment of the colorant blend insures proper adhesion of colorants to the crystal and thereby prevents the problem of colorant dusting. This material, moreover, contains lubricants which give excellent molding characteristics, including soft flow, good mold release, and freedom from surface defects.

Because of the smaller particle size and lubrication of Lustrex Colorant Blend which give faster plasticization, it has been found that this material can be molded at temperatures 10-50° F. below those of other styrene formulations. On many jobs approaching machine capacity this lower temperature permits shorter molding cycles. As a consequence of its excellent molding properties, the colorant blend is also being used on a number of straight crystal molding jobs in addition to its widespread use in dry coloring applications.

When dry coloring with Lustrex Colorant Blend was first introduced, many objections were raised by molders. Concern was expressed over the possibility of

[1] Manager of thermoplastic technical service, plastics division, Monsanto Chemical Co., Springfield, Mass.

difficult feeding to the molding machine, dusting and contamination of colors, trouble with machine clean-out between color changes, and molding shortcomings. After Lustrex Colorant Blend was tried on all makes of injection machines, it was proved these fears were groundless.

Equipment Required. Suitable tumbling equipment is important, but satisfactory results can be obtained with various types of tumblers, blenders, or mixers. Any of the following types should be satisfactory: (1) drum tumblers; (2) drum rollers; (3) conical blenders; (4) concrete mixers; (5) dough mixers; (6) ribbon blenders; (7) burnishing tumblers; and (8) tilting tumblers.

An end-over-end drum tumbler produces the maximum in color dispersion at a minimum of cost, and blending time required may vary from 5-20 minutes. Coloring with conical blenders produces somewhat better color dispersion with reduced clean-out problems, but the initial cost of the equipment is considerably higher than for the end-over-end tumbler. The cost of a concrete mixer is much less than that of either of the two mixers mentioned above, but results obtained in color dispersion are not quite so good.

In tumbling equipment best results are obtained with chromium manganese steel drums, but stainless steel or chromium plated drums may also be used. Mild steel drums are suitable if the surfaces are smooth and free from rust. Some molders have found that ordinary fiber-type drums are also suitable.

Explosion-proof motors are recommended as a precaution for driving the blender. Open-type motors may be used because no volatile or inflammable solvents are required in the coloring process. If inflammable solvents are used for clean-up, open-type motors should, of course, be avoided. Motors of ½-2 hp. are adequate.

If individual drums are used for each color, no clean-out problem will be encountered. If the same drum is to be used for different colors, however, a clean-out operation will be necessary between color changes. For an easy color change, vacuum cleaning and wiping out the drum with a cloth saturated with butyl acetate will suffice. For more difficult color changes, such as going from a dark to a light shade or from an opaque to a transparent change, more extensive cleaning is required. Repeated vacuum cleaning and solvent wiping, together with blending with a crystal clean-out charge, may be necessary. With stainless steel or chromium plated drums cleaning with soap and water may be sufficient.

Care should also be exercised in cleaning out the injection machine between color changes. The feed slide should be dismantled and cleaned with a dry rag or a rag saturated with butyl acetate. Streaks that sometimes appears in later colors are generally caused by improper clean-out of the hopper and feed slide during color changes, rather than by any adherence of the color particles to the cylinder walls or torpedo.

Weighing. Standard scales used for weighing the crystal molding powder, and an accurate commercial balance for measuring small quantities of colorants (see Figure 2) are the only other pieces of equipment required for dry coloring. In general, weighings which are accurate to three significant figures are adequate. This means that a student's type of analytical balance will be necessary for weighing some colorants, particularly transparents, which require very small quantities. Good-

Fig. 2. Weighing of Colorants Requires Accurate Balances

quality platform shadowgraph and torsion balances can be used for most pigmented color formulations.

Scales accurate to the nearest quarter-pound are suitable for weighing out the crystal. It is usually not necessary to weigh the crystal molding powder, however, since shipments in 50-pound bags can be poured directly into the tumbling drums.

Colorants. Many different types of colorants are used in the dry coloring process. As a class, oil soluble dyes are less stable to heat and light than inorganic pigments, and extreme care must be exercised, therefore, in the selection of dyes to be certain that they have adequate stability. A sacrifice in trying to match a particular shade is preferable to the use of an unstable colorant that might produce the more exact shade desired, but also cause rejections owing to color fading during molding or subsequent use.

For the translucent and opaque formulations a fairly wide range of colors in the spectrum range from yellow to red can be prepared from single cadmium colorants. To produce exact matches suitable toners can also be added. In the bright blue and green translucent colors no stable pigments are currently available having the required opacifying power. Consequently titanium dioxide or other opacifiers must be added with the green or blue pigments. Brown colors can be made from mixtures of iron oxides and cadmium red pigments. For darker browns carbon black is also added.

Suitable color formulations may be obtained from the following colorant processors: Claremont Pigment Dispersion Corp., Brooklyn, N. Y.; Ferro Enamel Corp., Cleveland, O.; Gering Products, Inc., Kenilworth, N. J.; Jamison Plastics Corp., New York, N. Y.; H. Kohnstamm & Co., Inc., New York; and Krieger Color & Chemical Co., Hollywood, Calif.

All these companies supply color formulations to match any required color. These colorants are already mixed and, in some instances, have received special treatments to provide improved coloring and molding. Some of the processors also offer the colorants weighed out in packages sufficient to color 100 pounds of crystal, thus eliminating the possibility of weighing errors by the molder.

These processors supply the colorants in a form which, in a number of instances, produces improved color dispersion, especially for those colorants composed of a number of ingredients. Another advantage in purchasing colorants from processors is reduced moisture susceptibility, since some untreated colorants tend to pick up moisture in humid weather. When mixed with the crystal styrene and molded, these wet colorants may produce silver streaks or splash marks in the molded pieces. Colorants purchased from some of the processors are usually treated to minimize moisture pick-up.

Painstaking care is exercised by the colorant processors to supply colors especially suited to the dry blending operation. Frequently this care requires the development of completely new color formulations. With these formulations it is now possible for molders to color to close tolerances and obtain commercial color matches. Undoubtedly much of the recent progress in dry coloring is attributable to the important role played by the colorant processors.

Safety Considerations. Although, to our knowledge, there have been no accidents in molding shops performing dry coloring of styrene plastic, certain precautions should be taken. Safety guards and switches should be employed on blending equipment. Operators should have complete instructions on operating procedures; good housekeeping techniques should be enforced; and proper lifting and handling precautions taken. In dealing with colorants, safeguards applying to the handling of other organic and inorganic chemicals should be applied. Employes suffering from skin irritations or allergies should not handle colorants.

Some mention has been made in the past of hazards associated with metallic powders. The main concern has been voiced over aluminum powders used in the manufacture of silver and some colored metallic molding powders. In other plastic fields explosions have occurred because of spark ignition of the aluminum powder dust. Accordingly, all equipment, particularly units having moving parts, must be well grounded to prevent static build-up, and explosion-proof motors and non-sparking tools should be used. Good plant housekeeping and proper methods of materials handling are needed to prevent the accumulation of dust. This point is important since these accumulations are often the source of "secondary" explosions and flash fires after ignition by the initial dust explosion. Blenders with no moving internal parts are the least hazardous, and, for this reason, drum tumblers and conical blenders are recommended.

The possibility of aluminum powder dust explosions can also be minimized or even eliminated by using the metallic powder in the form of a styrene dispersion. Aluminum powder surface treated with suitable wetting agents or lubricants will also show reduced dusting. Both treated and dispersion-type powders are available from leading colorant suppliers and processors.

It should be noted that there is no subsequent dusting when aluminum powder is added to Lustrex Colorant Blend. This is a consequence of the surface treatment administered to the crystal to eliminate dusting. With copper and bronze powders no explosion hazards have been encountered.

Advantages of Dry Coloring

The prime advantage of dry blending is economy in lowered costs of colored materials. Conversion costs are so low that the molder can save several cents a

pound under the cost of colored molding powder. The following table of typical conversion costs for coloring crystal styrene molding powder clearly indicates the economic advantage of using the dry coloring method:

Coloring Method	Conversion Cost, ¢ per Lb.
Dry coloring	½—1¼
Compounding by the molder	3½—4
Standard colored molding powder	4
Special colors	4—20

The main cost involved in dry coloring crystal styrene is that of the colorant itself. For transparent shades the colorant costs per pound of produce range from 0.048-0.90¢; while for translucent and opaque formulations the cost ranges from 0.044-1.2¢. Handling costs are approximately 0.2-0.3¢ per pound of produce; consequently the figure of 0.5-1.25¢ a pound for dry coloring is representative of the actual costs involved. From this statement it can be seen that a saving of approximately 3¢ a pound is realized in the manufacture of standard colors by dry blending. For special colors even greater savings are realized.

Another important benefit accruing from dry coloring is that of reduced inventory. Previously most molders had to keep on hand a large stock of various colored molding powders in order to meet orders. With dry blending, a reduced stock of crystal can be used to produce the desired shades. The experience of leading molders indicates that inventory can be reduced by as much as 75% with this technique, an important factor in these times of tight supplies. In addition to gaining storage space, less capital is tied up in stocks of material.

By being able to prepare any desired shade at a few moments' notice the molder is allowed greater flexibility of operation. This is particularly true of special colors and is an especially pertinent factor during periods of material shortage.

Another advantage of dry coloring is in reworking scrap. In the molding of most items a considerable quantity of sprues, runners, and rejected parts is collected and is subsequently ground and remolded. If the individual colors are segregated, the scrap can be rerun directly. However, if the reground colors are mixed, the problem arises of holding a desired shade. Here, dry coloring serves to good advantage.

The first step is to blend the various reground colors to see what approximate shade results. Assuming that an off-green, -blue, or -red is obtained, the corresponding dry color formulation can then be added to bring the resulting color into line with the desired virgin shade. Brown and black shades can also be produced from reground scrap. If the mixture of scrap yields a gray color, a red pigment can be added to produce brown. A mixture of carbon black and red pigment can also be added to the reground colors to give a brown shade. Similarly, carbon black can be added to the scrap for the manufacture of black molded pieces. To obtain improved luster and strength of color, it is suggested that 10-15% of Lustrex Colorant Blend be added to the reground material before the addition of colorants.

The available range of color has been one of the major reasons for the rapid growth of the plastics industry. Many items, however, have been produced only from crystal because of its lower cost in comparison with colored compounds. Dry coloring now provides a method of producing colored items at 0.5-1.25¢ a pound over crystal costs, and many items hitherto molded in crystal will now be converted to colors.

Comparison with Other Coloring Methods

In the past wet coloring of styrene has been used to a small degree. In the wet process colorants are dissolved in suitable solvents, mixed with the crystal, and then molded. This method, however, suffers from many shortcomings when compared with dry coloring. Firstly, it is more expensive; secondly, color dispersion is inadequate; and, finally, there is the problem of driving off the usually toxic solvent before molding. Since the introduction of dry coloring, use of the wet coloring method has declined.

Another factor in the field of coloring styrene molding powder, although limited in extent, has been the use of color concentrates. In this method a color concentrate is prepared by compounding a high concentration of color into the styrene resin. This concentrate can then be blended with crystal styrene in varying ratios (from 2-100 parts crystal per quart of concentrate) and then injection molded directly. This technique is rather limited. It usually requires thick-sectioned pieces and various molding aids to yield satisfactory products and is, therefore, not so universal or flexible as dry coloring. Besides, the use of color concentrates is more expensive than dry colorants and usually entails an inventory problem.

Summary and Conclusions

Through the use of dry color blending it is now possible to produce a wide range of toys, novelties, housewares, and other items previously molded from processed colors. Completely satisfactory colors are obtained by dry blending at a reduction in material cost of approximately 10%. With recent innovations in molding and coloring techniques inroads are being made into industrial applications. The styrene molding industry should benefit by this development of dry coloring and should continue to expand as new equipment, coloring techniques, blending experience, and molding aids are acquired.

SPE Sections Discuss Plastics Problems

APPROXIMATELY 40 members and guests of the New York Section, Society of Plastics Engineers, attended the first regular dinner-meeting of the year on February 21 at the Hotel Shelburne, New York, N. Y. Two talks were presented during the technical session: Rolland Jenkins, Reco Sales Co., discussed "Static Elimination with Alpha Rays," and Robert D. Sackett, Monsanto Chemical Co., spoke on "Improvement of Thermoplastic Products by Post-Molding Treatment." Mr. Sackett substituted for S. R. Melvin, who had been scheduled to speak, but was unable to attend.

Using slides to illustrate his talk, Mr. Jenkins discussed the use of polonium for temporary dissipation of static charges in the processing of plastics. Alphatron polonium destaticizers sold by Reco are manufactured by Canadian Radium & Uranium Corp. in two forms, bar type and blow-gun type. The bar-type static eliminator consists of a metal strip or form partially plated with polonium; the ends are left uncoated for handling and installation. A gold coating is electroplated over the polonium to protect it and personnel handling the bar. This bar-type destaticizer is particularly suitable for film and sheeting processing operations.

For molded plastics the company makes Alphatron blow guns to eliminate static charges prior to finishing operations. These blow guns have a polonium foil liner inside the nozzle. In both the bar and the blow-gun types, the polonium emits alpha particles and ionizes the air, and the ionized air then neutralizes any static charges in the plastic. Mr. Jenkins emphasized that polonium is a pure alpha particle emitter and does not give off beta and gamma particles as other radio-active materials do.

Mr. Sackett stressed the importance of post-molding treatments, which are relatively inexpensive, for greatly increasing the salability and utility of many plastic articles, with consequent increase in profits for the molder. Using slides to illustrate his talk, the speaker discussed different types of post-molding treatments, including decoration, assembly, metallizing, annealing, and destaticizing. Decoration is the most popular of post-molding treatments and includes lacquering, silk screening, printing, gold stamping, rubber stamping, application of decalcomanias, and the like. At a small additional cost, decoration yields items with greatly increased eye appeal, salability, visual contrast, and flexibility (production of items of different appearance from the same original moldings).

Since many items cannot be molded in one piece, the use of assembly techniques greatly magnifies the field of plastics application. Included in this category are cementing, and the integration of parts by means of heat, friction, or other physical force. Metallizing enables the plastics manufacturer to coat his product either entirely or in part with a thin film of metal and thus provide physical and chemical protection as well as hide any defects in color or appearance. In addition, the process gives parts that combine the light weight and low cost of plastics with the luster and surface hardness of metals. These metal films can be applied by means of electroplating, vacuum metallizing, or cathode sputtering.

Annealing provides a simple and inexpensive means of strengthening parts, particularly those with thick sections or varying thicknesses, by relieving internal strains or stresses. Annealing may be accomplished in either an air or hot water bath at a temperature about 5° F. below the heat distortion point of the plastic. Destaticizing may be accomplished by treating the plastic article with a material to form a conductive film that drains the static away. Both temporary and permanent types of destaticizing treatments are available.

In the business session preceding the talks, Section President George Baron, Ideal Plastics Corp., announced that Arthur L. GeWertz, manufacturers' representative, has taken over the duties of secretary-treasurer for the year and that Mr. GeWertz and Richard Stott, Stott

(*Continued on page 697*)

Scientific and Technical Activities

Akron Group Symposium on Statistical Quality Control

MEMBERS of the Akron Rubber Group who braved inclement weather and icy streets to attend the organization's fourth annual mid-winter symposium-type meeting at the Mayflower Hotel, Akron, O., February 2, were treated to one of the most interesting and best organized programs the Group has presented.

Sub-zero temperatures and a record fall of nearly a foot of snow on the preceding day cut attendance at the meeting to 416, about a third less than in '50.

The symposium was devoted to "Quality Control by Statistical Methods," and the principal speaker was William H. Smith, manager of the analysis department, Ford Motor Co., Dearborn, Mich. Mr. Smith has been with Ford since 1934. Prior to 1948, when the present analysis department was established, he had been in charge of inspection for the Ford steel mill, pressed steel plant, gear and axle plant, frame and cold heading plant, and plastics plant.

Following Mr. Smith's talk, a panel of experts recruited from the rubber and the rubber chemicals industries answered questions regarding the application of statistical methods to the production of rubber goods and the raw materials that go into them. The panel included Joseph Torrey, Goodyear Tire & Rubber Co.; Harold J. Harmon, factory manager, The General Tire & Rubber Co.; Leonard M. Freeman, assistant works manager, The B. F. Goodrich Co.; R. J. Luebbers, Firestone Tire & Rubber Co.; M. E. Marks, Columbia Chemical Division, Pittsburgh Plate Glass Co.; and Mr. A. C. Freeland, Ohio Rubber Co.

In his talk Mr. Smith emphasized the point that statistical methods of control are intended not so much for weeding out defective parts as they are for the prevention of defective products. He also emphasized that this type of control can be effective only as long as it has the whole-hearted support of management.

"Employes have to hear more than chest-beating upstairs if they are to be convinced that quality workmanship is a matter of urgent concern," Smith said.

He also pointed out that many otherwise enterprising manufacturers perform inspections for the sole purpose of sorting the product they can sell from the product they must keep off the market. Priceless experience which they gain is then shoved out the back door with the scrapped product instead of being used to build quality into the product in the first place.

He also mentioned the fear of statistical control methods by those unacquainted with them. He stated that the intelligent use of this method is no more complicated than changing a tool bit. In the speaker's opinion the method itself is a tool and one of such flexibility that it can be used in any kind of industrial activity.

At Ford there are now 14,000 control chart applications in machining processing, assembly and receiving operations. The company also offers its hundreds of suppliers the services of a training department for acquainting key production and inspection people, with statistical methods of control.

The Dinner Meeting

The afternoon technical session was followed by a social hour, dinner, and an evening program featured by Herman Hickman, Yale University football coach and television celebrity. Hickman gave an extremely entertaining, although brief, talk. Transportation difficulties prevented the arrival of films he had intended to show and resulted in a shortening of Hickman's performance.

At a brief business meeting following the dinner, the nominating committee reported selection of the following candidates for 1951-52 offices: chairman, D. F. Belney, Harwick Standard Chemical Co.; vice chairman, L. M. Baker, General Tire, and John Brothers, Ohio Rubber; secretary, K. J. Kennedy, Goodrich, and Ted M. Kersker, Firestone; treasurer, Kenneth R. Garvick, Firestone, and V. L. Petersen, Goodyear.

It was also announced that the Akron Rubber Group now has 929 dues-paying members which, it is believed, makes it the largest rubber group in the country.

The next meeting of the Group is scheduled for April 6 at the Mayflower.

Panel Discussion

Q. Most writings and instructions on the subject of quality control deal with specific applications in the metals industries, or in cases where close control over dimensional variation is the primary aim. To what extent is modification necessary in adapting statistical techniques to needs of the rubber industry?

A. Mr. Torrey. In the metals industries a large proportion of the quality control effort is exerted in the direction of holding dimensional variations within close limits. This effort is necessary not only to insure performance in service, but also to facilitate the assembly operations. In the fabrication of rubber articles, however, dimensional variation is much less of a factor. Components which vary considerably from specification can be assembled without any particular difficulty, and in many cases material may be considerably out of tolerance in either or in both directions without producing any appreciable effect on serviceability. For instance, treads which are run too heavy, or plies which are cut too wide, can usually be applied without difficulty, and without detriment to the product, though in such cases there is obviously a waste of material.

On the other hand, of course, rigid control of such features as cord angle, tread length, etc., is of major importance from the standpoint of quality. Dimensional data are, of course, used extensively as a means of assessing and maintaining levels of performance, and of keeping the cost of material used in the product in line, but the condition of materials and the workmanship applied to their fabrication and assembly are major considerations in determining the serviceability of the product. The characteristics which make rubber valuable are its elasticity and its ability to change dimension, and at every point in the manufacturing operation the rubber goods producer is up against such factors as dimensional change through shrinkage, etc., which continues almost indefinitely, distortion which enters the picture whenever a component is handled, and the effect of changes in the nature of the rubber compound itself with respect to such characteristics as tack, bloom, etc.

The quality of the product, therefore, depends very largely on the effort and skill of the organization, or the operator in controlling and minimizing the effect of these variables, and for that reason a control system in a rubber goods plant probably includes a greater proportion of "P" (% defective) charts than will be found in industries where dimensional control is the primary aim.

The second point is the fact that rubber goods manufacturers (particularly the larger companies) are converters to a greater degree than is found in most industries, and the materials they use are raw materials in the best sense. They take their rubber directly from the plantations, cotton right from the cotton fields, sulfur from the mines, carbon black from the furnaces, etc. In tire and tube manufacture valves are about the only fabricated or semi-fabricated component purchased. As a result, the sampling and inspection of incoming materials, though extensive, are a fairly simple process and therefore absorb less of the quality control effort than is the case in the metals industry, where most manufacturers purchase a large percentage of their components complete from other specialist fabricators. The basic system is, of course, the same in both cases. The difference lies in the distribution of control effort, which in rubber manufacture must be directed more toward the operator than in the direction of a machine condition.

Q. How would the "acceptable quality level" of rubber goods (good-quality mechanical rubber parts) compare with metal or other precision parts in application to incoming sampling acceptance plans?

A. Mr. Luebbers. The rubber product will be measured with less precision than the metal product and also the "acceptable quality level" might be lower for the rubber goods. For example, an "acceptable quality level" for mechanical rubber goods might be 5% of parts out of tolerance; while for metal parts it might be ½%. Actually, for either industry, this figure might vary from very low to very high, depending on how tight the tolerances have been set.

Q. Where is the best place to start a statistical control program, on incoming materials, finished products, or on processing methods and equipment?

A. Mr. Freeman. Generally speaking, the best place to start a statistical quality control program would be on very simple laboratory or factory operations. Among the considerations which might determine the particular selection should be the similarity between an operation and the basic examples of applications in the metals industry. Such a start will allow a quality control engineer to study and develop methods of applying the various statistical techniques to the particular in-

dustry involved. It would probably be undesirable to start a program on either incoming materials or finished products. The reason for this belief is that although the possibility of rejecting good material and accepting bad material has always existed, as soon as this happens with the quality control system, many doubts will be cast at the statistical methods which are usually new and strange and often mysterious to vendors or production personnel. It would appear much more desirable to let these people feel that these methods have already been proved in the industry.

Q. During the compounding of rubber there are many variables present which affect the properties of the final product. Many different machines, furthermore, are used which give rise to variation. Since this is the case, can it be assumed that statistical laws apply; i.e., is the probability theory valid?

A. Mr. Marks. The use of statistical quality control depends on a random distribution of each variable present in any particular process. In the case of rubber compounding each variable has its own random distribution. Also each machine used adds its own random effect. The total result then is the sum of these variations which can be treated separately or as a whole. Thus it is possible by quality control to separate each variable and analyze it by itself or to test the total variation on the final compounded material. The number of variables is not important; it is the variation in the final product that is.

Q. Are control charts kept for raw material properties?

A. Mr. Marks. Generally speaking, statistical methods are used in the rubber processing industry for controlling the quality of raw materials; however, this practice does not necessarily involve the use of the control chart techniques. These methods are in some instances being used by chemical suppliers to control daily production. In at least one plant producing reinforcing pigments the methods are being used to good advantage to control quality of daily production, to determine trends in production quality, to set up production specifications, and to analyze data from development and research investigations.

Q. Has anyone been able to determine with reasonable accuracy the relative effect on batch quality of raw material variations *versus* processing variations, by quality control analysis?

A. Mr. Freeland. There is no clear-cut, all-inclusive answer to this question at this time. Each plant has its own particular problems of equipment, manpower, and stock specifications which all affect the result. On one type of stock the material variations may be the principle cause; while on another stock it may be the control of compounding equipment, Banburys, mills, etc. We know of some plants conducting systematic investigation of this matter, and technical papers have been published showing the application of statistical control techniques to various phases of this problem.

Q. Is the panel acquainted with any application of actual control charts to Banbury batch mixing times as recorded by Esterline-Angus wattmeters?

A. Mr. Freeman. No. Some information concerning the use of control charts in conjunction with a Banbury temperature recorder is available in the article, "Quality Control of Factory Mixed Batches of Rubber Compounds," by Paul E. Gnaidinger, of Dominion Rubber Co., in the March, 1949, issue of *Rubber Age*.

Q. Has statistical quality control been applied to calendering operations?

A. Mr. Torrey. Quality control of calendered fabric starts with the fabric itself. The textile mill is expected to produce fabric within certain limits of uniformity, and it is the rubber goods manufacturer's responsibility to assure himself that the limits are being met, either in the mills he operates himself, or by appropriate inspection of the material as received. As a preliminary to the calendering operations, the general practice is to predip the fabric, and control in the factory obviously must start at this point. The three factors to be controlled at this stage are the amount of dip applied and the changes in length and in width encountered in this operation. Of these three factors, width variation is the major problem, and the record of width changes with time is used to obtain data for the control of the predip process.

In the calendering operation are two important variables, i.e., width (which governs cord count) and amount of rubber compound deposited on the fabric. It has been demonstrated that variations in calender "squeeze" can produce differences in overall gage of fabric calendered with a uniform deposit or rubber compound, and for this reason the gage of the composite sheet is seldom used as the primary control. The control of most calendering processes is attempted by means of control of the weight of compound applied per unit of area. To determine the area of any given roll for this purpose it is, of course, necessary to secure an accurate length measurement at the wind-up and to maintain close control of width at that point.

The weight of compound applied to the roll is computed from weights taken before and after calendering. From these data it is a simple matter to arrive at an average unit weight figure for the roll in question, which may then be compared with the specification as a basis for acceptance or rejection. The most troublesome factor at this stage is that of width variation, and for this reason it seems advisable to use width as the variable for plotting calendar performance. In tracing down defects and in general effort for improving calender technique there is the need of unit weight plotting from samples taken throughout and across the roll, but it should not often be necessary to go to this length.

The subject of calender control is also discussed in an article, "Developing a Calendergraph," by Anthony Gladko, of Johnson & Johnson, in the September, 1949, issue of *Rubber Age*. This article explains the use of control charts and methods to determine process capabilities.

Q. What practical applications have been made of statistical quality control in the tire industry, particularly in connection with in-process control?

A. Mr. Torrey. Statistical charts are being used effectively for control of most of the more important processes in rubber goods manufacture. In addition to the cases quoted in the answers to the preceding questions, control charts, using one or two selected variables, are effective in such operations as: extruding tire treads and tubes; milling; calendering; fabricating breakers (calendering and lay-up); making beads (insulation and building); ply and band building (cutting dimensions and assemblies); passenger tire building; pre-cure inspection; tire curing (use of "P" chart); post-cure inspection and balance testing; tube valve manufacture; tube manufacture (use of "P" chart); tube inspection; and labeling.

With most of these operations, control charts can be developed to a point where they pin-point the operator or unit involved. In addition it is desirable to maintain charts on a number of items evaluated by checks made on the cured product, such as tire weight, bead width, rim cut, curvature, etc. Such items, though not necessarily the responsibility of any individual operator, should be kept under close control for technical and service reasons.

Q. What are some examples of statistical control that have been carried out successfully in the production of mechanical rubber goods?

A. Mr. Freeland. Various plants have been very successful in applications such as molding of motor mounts, grommets, vibration dampers, etc., and extending over into such phases as control of adhesion quality on rubber-to-metal bonding jobs and deflection quality. Actual charts have been plotted on individual press operators to control rejects in the process. Charts on adhesion tests have been used successfully to isolate causes for poor adhesion and to obtain correction. In many cases excellent results have been obtained by the use of the simplest form of control charts, with control limits set up in some cases based on practical operating considerations rather than on actual statistical control limits.

Q. Is the application of standard sampling tables to molded goods practical with molds of 25 to 50 cavities?

A. Mr. Freeman. In most cases involving small-sized molded goods, the standard sampling tables will not be found satisfactory for process control where a mold consists of 25-50 cavities because the cost of adequate sampling and inspection is likely to exceed that which can be tolerated. For lots of 25-50 pieces, samples as small as five or six pieces give AOQL's in the range of 5-7%. Such an AOQL[1] would probably be objectionable to a manufacturer or retailer receiving material of this quality. Larger samples necessary to reduce the AOQL would, of course, increase the inspection cost. Several other statistical quality control techniques would probably be more suitable in this case.

Q. Is statistical control as applicable to short runs as to long runs?

A. Mr. Luebbers. Statistical control is applicable to short runs; in fact, we have had our greatest success on short intermittent runs. With this type of production, scrap or rework at the beginning of the run, while the machine is being adjusted to give satisfactory performance, may amount to a large percentage of the total volume of material processed. With this point in mind we have set up controls on the various adjustments that can be made in the processing operation as well as on the finished product. This procedure standardizes the processing operations from run to run and results in a reduction in time between starting up and the production of a satisfactory product. In the rubber industry particularly, it is with short intermittent runs that statistical control offers the greatest promise of showing savings in scrap and rework material as well as improvement in product quality.

Q. Do intermittent runs impose special problems?

A. Mr. Freeman. The greatest problem encountered with the use of statistical control in operations involving many intermittent runs is that of impressing people that any operation which is "in-control" should remain "in-control" regardless of

[1] Average outgoing quality limit.

the time intervals. Although control charts show a plot of variables *versus* time, the time factor represents order-of-occurence of events and is not considered a variable itself. Therefore the problem of control of intermittent runs is actually only a problem of continuing established control procedure.

Q. What is the minimum number of specimens necessary to determine, with a good degree of certainty, the characteristic stress-strain properties of a typical rubber compound?

A. Mr. Freeman. No one "minimum number of specimens" can be definitely stated. There is a statistical formula, $t = \frac{d\sqrt{n}}{\sigma'}$, which can be applied to determine the sample size necessary in each case studied. In this formula t represents the probability of obtaining the correct result and is chosen on the basis of expected risk. Thus, if it is desired in a group of tests to have not more than one out of ten chances for incorrect results, t would be obtained for that stated risk from a probability table based on normal frequency distribution. d is the allowable difference between the true value and the results obtained. σ' is the true standard deviation of the results and is usually taken as the average σ obtained from a substantial number of tests. With these values determined it is then possible to compute n, the number of specimens required. The formula mentioned may be found in the book, "Industrial Statistics" by H. A. Freeman. No examples are given in this text however, for the particular application mentioned here.

Q. When running laboratory tests, are you measuring product variability or testing variability?

A. Mr. Luebbers. When taking any measurement or running any test, the data obtained always include both product variation and testing or measuring variations. It has been general practice in the past either to ignore the testing variation and assume all the variation to be product variation, or to estimate by experience the test accuracy and temper the conclusions according to an estimate of the reliability of the test method.

Statistical techniques are available to determine quite accurately the precision of any measurement or test. A simple technique which has many applications is to repeat a test or measurement a large number of times on the same sample or parts of the same sample. It is quite logical to assume that the variation obtained by such repeated testing is test variation. The standard deviation is then calculated as an index of the test accuracy. The true product variation can then be calculated as follows:

Product σ^2 = Measured σ^2 — Test σ^2

Q. Are control charts used to determine limits for laboratory control of uncured batch stock?

A. Mr. Luebbers. Since I believe the general practice in the industry is to take only one sample for each batch of uncured stock for test purposes, the usual X and R charts would not be applicable since no values for R would be available. If two or more samples were taken per batch, the X and R charts could be used with the limits being computed for average and range. When only one sample per batch is taken, the procedure is to plot a histogram of the test results and calculate the standard deviation. Limits are placed on the histogram three standard deviations (3σ) from the average, and values falling outside these limits are assignable, that is, no chance variation is expected.

Q. How can quality control be used to check the precision of physical control laboratory work?

A. Mr. Marks. The precision of any physical test can be determined by running daily tests on a standard sample. This standard is prepared daily by compounding from a large stockpile of standard ingredients and milling and molding under standard conditions and testing in the usual manner. The data, for example, from a stress-strain curve can then be statistically analyzed and placed on an X and R control chart. The precision can be calculated from the upper and lower control limits. Any uncontrollable errors which occur are easily found since they appear outside the limits. The precision obtainable at various places in the preparation and testing of rubber can be found by making suitable experiments wherein other variables held constant are eliminated by a variance calculation.

Q. Are analyses of variance techniques more suited for interpretation of data in relation to compounding?

A. Mr. Freeman. Analyses of variance techniques are very powerful statistical tools generally best suited to interpreting the results of carefully planned experiments usually limited to a predetermined size and pattern of sampling. They are used for evaluation of assignable cause of variations.

Anaylsis of variance techniques would be extremely difficult to use as a permanent factory control since few statisticians are normally available in factory operations. Other methods involving the simpler control chart can often be set up to give the same information in an easily understandable form. For example, a control chart for ranges may be used to show variation "within samples"; a control chart for averages may be used to show variation "between samples"; while the control limits on this latter chart may be interpreted as giving a comparison of "within sample" and "between sample" variations. A control chart for individual readings may be used to show "total" variation of the process, and the control limits on this chart give a comparison of "within sample" variations with "total" variation of the process. Such control charts are easily explained and, being readily interpreted by production personnel, can be used as a basis for immediate action in factory operations. In general, the use of analysis of variance should be limited to operations for which a trained statistical engineer is available.

Q. If data from four different test laboratories (on a standard sample) are grouped and 3σ limits calculated for each laboratory, exactly what information is obtained that was not previously known?

A. Mr. Marks. Statistical quality control is especially useful for determining the variation in results between laboratories, and this can be accomplished by setting up quality control charts for each laboratory and one between laboratories. Better tools are available for the job, however, than "3σ limits." For example, the "t" tests or a similar test of significance may be used. This type of test would show if the differences between the laboratories were real or chance.

Q. When more than one person is involved in a specific operation, how should quality be measured?

A. Mr. Harmon. We use "P" charts, pin-pointing the crew rather than the individual. While we don't feel that charts of this nature produce the results that individual charts do, we have been able to instill a spirit of competition between crews, which has given us definite results in waste reduction.

Q. Should a statistical quality control curve be established on an operation where certain elements to be considered are the result of defective work performed by others?

A. Mr. Harmon. In no case should an operator be charted where an element of doubt exists as to who is responsible for the defective work. We have "P" charts on our tire cure men, but only certain defects are charged to an individual operator. These defects are listed, and each cure man knows and is in agreement before the chart is started that the listed defects can be caused by faulty workmanship. If an element of doubt exists, the chart loses its effectiveness.

Q. Can statistical quality control be used as an element for promotion?

A. Mr. Harmon. Yes. Performance records become a part of the individual's personnel file, and a good record carries considerable weight when men are being selected for training and supervisory work. The reverse is also true; continued poor performance by an operator gives supervision a good argument in selling people on leaving a job for which they are evidently not suited. In several instances operators have requested a transfer because of their continued poor performance on a given job as shown by the quality control chart. No attempt has been made to use the control chart as a club, however, in transferring personnel from one job to another.

Q. Can statistical quality control methods exist in operations where an inspector's judgment, and not tolerances, are the criteria for acceptance or rejection?

A. Mr. Torrey. In rubber goods manufacture there are probably a larger number of cases where the judgment and experience of an inspector must be relied upon for the acceptance or rejection of material than there are in most other industries. No statistical quality control system in a rubber plant would be complete that did not include a number of chartings where such criteria are used. The main requirement in such cases is to avoid hair-splitting decisions. We have found it good practice to have inspectors check all questionable items with supervision on the spot and obtain their agreement to the criticism before including the mention of the questionable items in the inspection report.

Q. Are statistical methods applicable to analysis of road test data from fleet tire tests?

A. Mr. Freeman. Statistical methods have been very successfully applied to analysis of tire road test data. An article, "Use of Statistical Methods in the Planning of Road Wear Tests," by J. M. Buist, R. G. Newton, and E. R. Thornley, was published in the *Transactions of the Institution of the Rubber Industry*,[1] London, England, on this subject. Analysis of variance techniques is used, and the methods described are quite complicated. It is beyond the scope of this discussion to cover details of this application here, especially since considerable training in statistical methods would be a necessary prerequisite for proper understanding.

Q. Can statistics be applied in research on rubber?

A. Mr. Marks. One of the most promising, but least explored fields for the use

[1] 26, 4 (1950).

of statistics is in the laboratory. Too many research reports contain qualifying statements based on judgment alone. Any set of data obtained under controlled conditions is amenable to statistical analysis. The data are either significant, or they are not, and if they are analyzed statistically, the research chemist can make a definite statement. While it is true that in many cases the answer is obvious, in many other cases it is not.

How often have we heard a research man say, "This set of data shows that the temperature had no effect, because the data were not precise enough"? A statistical analysis might have shown a trend, and a valuable contribution to the experiment might not have been missed. By use of statistical methods, experiments can be properly planned so that all the information needed is collected, and less work can result in more and better conclusions. By variance methods variables can be changed scientifically for best results; whereas usually only one is changed at a time.

Q. On what basis can the cost of installing a quality control system be sold to management?

A. Mr. Harmon. We feel that quality control must be sold to management on the basis of improved quality of the product. Your aim should be to improve constantly the quality of your product, and a statistical quality control program properly installed and administered should result in maintenance of a high-quality level and an increasingly better product. The resultant reduction in waste and the savings in dollars and cents can be used as a selling point, but we do not recommend it. The amount of money spent on accumulating and charting the information necessary for an adequate statistical quality control system depends almost entirely on the degree of quality consciousness of a firm.

Q. What is the best method of selling statistical quality control to non interested foremen and supervisors?

A. Mr. Torrey. Most of the difficulties with supervision in installing statistical practices arise from incomplete understanding. The control chart is intended primarily for the use of production supervision, and without this group's interest and support there is no assurance that action will be taken on any conditions brought out by the data presented. Without remedial action any control system loses much of its effectiveness.

The first requirement, therefore, is that the production men be given a clear idea as to the reason for selecting the control point, the method by which the checks shall be made, and the way in which the detail of the posting shall be handled. Once all this has been done, there is little reason for anticipating opposition from supervision to any such activity.

Of course in those cases where the production department is expected to undertake the expense of the spot check, the situation is more complicated, as the foremen will naturally wish to have some assurance that the results obtained will be worth the effort and expense incurred. About the only approach in such cases is for the quality control organization to use its own personnel to carry out the initial stages of the application and bring it to a point where its advantages are apparent to all. Thereafter production supervision may be expected not only to use the chart in question effectively, but to initiate requests of their own for similar postings on other processes.

A point which contributes heavily to selling a statistical control system is the protection it gives a department against unjustified criticism from others. We are all familiar with the individual who, when trouble develops in his own section, immediately rushes off to another department in an attempt to blame his difficulties on someone else. Nothing is better than to take such an individual up to the control chart covering the operations in question and to show him in a way that permits no argument that the trouble is in his own department and nowhere else.

Q. How much, if any, should labor be instructed on the purpose and interpretation of a new control or of the system as a whole?

A. Mr. Freeman. Labor plays one of the most important parts in the success or failure of any new control system. One practice is to chart an operation for at least 30 days in the control office until it is certain that the information is accurate and that the chart portrays the true conditions of the job. The general foreman should then call the department representative into the office and go over the program in detail. The employes who operate the machine are then called in, and a complete explanation is made of the proposed chart and the defects with which they will be charged. It is believed that these people want to know how they compare with other operators on the same machine. We attempt to create pride in workmanship, and we know from experience that they appreciate knowing exactly where they stand on quality workmanship. No attempt is made to do a hurry-up job of installing charts in any department. The ground work of contacting the union and the workers themselves is essential in order to get full cooperation of the employes.

Q. Which has the most appeal to the average piece worker as a reason for improving his work, "cost saving" or "improvment in quality?"

A. Mr. Harmon. The answer to this question is very definitely "improvement in quality." We believe that 99% of all workmen want to do good work. The biggest advantage that has been found in the use of control charts is the competition aroused among individual workmen on a particular machine. One company recently started the practice of awarding an automatic pencil to each employe who has attained a perfect goal on the control charts for a 30-day period. It is surprising the amount of interest generated by some little reward offered for good workmanship.

Q. What are the arguments for and against attempting to chart information in such a way as to pin-point the performance of individual operators?

A. Mr. Freeman. It is usually most desirable to pin-point the performance of individual operators, machines, etc., as much as possible. This policy prevents the "averaging-out" effect which the grouping of results gives and which permits poor workers a chance to slip by low-quality items. Pressure is sometimes exerted to prevent such pin-pointing in order to allow the poor workers to go unnoticed within a group. Jealousies or individual antagonisms are generally not aroused when the workers fully understand the control system and when care is exercised to maintain its impartiality.

Q. What recommendations can be made toward interesting suppliers in the use of statistical quality control methods and the reporting of such data on each shipment of material to customers? Just what is expected of the supplier in the use of quality control methods? Will not the use of such methods increase overhead for the suppliers? How do you overcome the objections of the supplier to the use of control methods when a seller's market is in existence?

A. Mr. Freeman. This question is rather all-inclusive when a seller's market, etc., is included; however, we must go back to the basic principles of statistical quality control. This afternoon we have heard Mr. Smith give examples of how quality control has saved money in the many places it is used in his company. The chances are good, therefore, that when a supplier applies quality control to his process, he will also lower his costs below those of his former method of operation. Any manufacturing concern is interested in means of lowering costs regardless of whether it is a buyer's or seller's market. The manufacturer should also realize that he is already running tests to control the manufacture of his product and that these may not be on a statistical basis. If he will review his control procedure and put his sampling, testing, and control of quality on a proper statistical basis, then he will: (1) improve the quality of his product; (2) reduce costs; (3) know the quality level of the material he is selling.

Q. What will be the effect of the general adoption of statistical quality control in industry on its relations with the Armed Forces inspection and procurement agencies?

A. Mr. Torrey. In view of the fact that all Armed Forces procurement and inspection agencies have adopted the statistical approach, there is no question but that manufacturers who are not familiar with it, or who do not use it, will be very much at a disadvantage in their dealings with the government.

Several years ago when the Army Ordnance Department first published its pamphlet on statistical quality control a great many of its inspectors had insufficient knowledge of the subject and could not apply it effectively. In such a situation there is great danger. Now, however, the government inspectors are being trained to a point where they understand and can use this statistical quality control system effectively, and we believe that the overall effect will be to improve the relation between industrial concerns and government inspectors.

The principle of qualification of specific lots or shipments is, however, something that must be approached with caution. Government inspectors at present are few in number, and most of them do not have the time to check thoroughly any considerable quantity of manufactured goods. Furthermore, whatever checking they do at this stage is necessarily with respect to surface conditions, most of which have little, if any, effect on field performance. Any drastic action taken on the basis of inspection of this type is probably unjustified. This situation will become more of a problem if the amount of goods to be inspected by the government is increased since the additions to the inspecting staff will almost certainly be men of little experience.

It seems to us that the main aim of the rubber goods manufacturing industry in this connection should be to induce government inspectors to watch for trends and tendencies in the condition of the product shipped by the various facilities and to take action on this basis in preference to holding up large lots of manufactured goods because of the incidence of some superficial defect. The aim should be to reduce the number of defects in future production rather than to comb it out of the material already produced.

C. M. Miller and Technical Committee Chairman J. B. Larkin, Patterson-Ballagh Division, Byron Jackson Co.

Rubber in Aircraft

SOME 267 members and guests of The Los Angeles Rubber Group, Inc., attended a regular meeting on February 6 at the Hotel Mayfair, Los Angeles, Calif. The program included an afternoon technical session, followed by a dinner-meeting sponsored by The B. F. Goodrich Co. The technical session featured a talk on "Rubber in Aircraft — Design Requirements and Applications" by Charles M. Miller, Northrop Aircraft, Inc.

Mr. Miller noted that the weight of rubber used in military aircraft may be as much as 10% of the total dry weight of the airplane, with tires and fuel cells accounting for more than 80% of the rubber used. Packings, gaskets, and seals, which account for 3-7% of the rubber used, were the subject of the talk. The speaker began with a discussion of rubber parts with regard to fuel applications, hydraulic oil applications, weathering and oxidation, installation methods, door seals, and low temperature testing.

Rubber compounds now being used for fuel seals and gaskets show marked swell and shrinkage properties when used in fuels which vary in aromatic content. This problem is so important that a special Air Force-Navy-industry meeting was held in Washington during February to discuss possible solutions. Rubber compounds now used in the petroleum-base hydraulic oil applications are fairly satisfactory, but the use of new non-inflammable hydraulic fluids will pose a tremendous problem. Deterioration of rubber parts because of weathering or oxidation is a current and potent problem. Test methods to evaluate oxidation and criteria for inspection and replacement of parts are not well defined and need further work.

Mechanical fastening is best for rubber parts, with a slow draw-up method using adequate back-up strips giving the best results. Drive riveting is the most deleterious method of installing rubber parts. Cold cementing is satisfactory if the process is closely controlled, the rubber properly compounded, and the joint carefully designed. Vulcanizing or hot cementing are satisfactory if the part is properly designed. Non-pressurized door seals rely on the resiliency of the rubber compound to achieve the seal. Design requirements are: 20% bulb compression; weather resistance; tear and abrasion resistance; low compression set; low temperature flexibility; and easy installation. Aircraft material specifications use the bent loop method of testing low temperature flexibility, but will probably require Young's modulus testing as soon as test equipment is available and values become established.

L. R. Keltner, B. F. Goodrich; J. E. Gulick; Group Chairman R. D. Abbott, R. D. Abbott Co.; and G. L. Matthias, Goodrich

Mr. Miller concluded by stating that the optimum compound for use in aircraft should be capable of being extruded, molded, and calendered and also should have the tensile strength, tear strength, an elongation of natural rubber; low compression set; the weather resistance of silicone rubber; oil and fuel resistance superior to nitrile rubber; low temperature flexibility to —100° F.; the capability of withstanding continuous exposure to 550° F. with a maximum reduction of 10% in mechanical properties; and the ability to be cemented to itself, metals, or plastics without pressure or heat.

The after-dinner speaker was J. Earl Gulick, of Goodrich, who spoke on "Where Are We Today in Rubber." Mr. Gulick called tire rationing or a recurrence of the rubber shortages noted during World War II highly improbable. There will be plenty of rubber for essential military and civilian needs during 1951 in any world condition short of global war and provided motorists buy tires only when they actually need them. The speaker also said that crude rubber prices should decline materially this year if world conditions do not worsen.

The meeting closed with a drawing for nine door prizes contributed by Goodrich and won by the following: Del Shade, Ohio Rubber Co.; Bob Johnson, Molded Rubber Specialties Co.; W. A. King, Kirkhill Rubber Co. (two prizes); A. J. Falkenburg, American Mineral Spirits Co.; Jim Cravens, Firestone Tire & Rubber Co. of California; F. A. Steele, retired; R. A. Olson, Naugatuck Chemical Division, United States Rubber Co.; and Mike Rochowicz, U. S. Rubber.

Course in Rubber Technology

A new spring course in rubber technology, sponsored by Los Angeles Rubber Group, is being given at the Los Angeles City College. Leonard C. Boller, Technical Coating, Inc., is class director of the course, which will be given for 16 weeks starting February 7. The course consists of lectures by leading authorities in the rubber industry, open forum discussions, and plant visitations for practical demonstrations. Subjects to be covered include natural and synthetic rubbers, compounding, processing and processing machinery, vulcanizing and vulcanizing machinery, latex, adhesives, specialty products, administration, costs and scheduling, and others.

Golf Tournament

The Los Angeles Group held its first golf tournament of the season on February 16 at San Gabriel Country Club, with 51 members and guests participating. Arrangements were handled by a committee under the chairmanship of R. L. Bowen, Xylos Rubber Co., and prizes were supplied by a committee headed by T. A. Hoyle, B. F. Goodrich Chemical Co. Prize winners follow: blind bogey, C. L. Smith, Firestone; most sand traps, Walter Newstrom, International Paper Co.; low net, R. N. Phelan, Atlas Sponge Rubber Co.; low total putts, H. Sherman; low gross, Mr. Straub; longest drive, Mr. Bowen; longest putt, G. M. Foos, C. K. Williams & Co.; and closest to hole on tee shot, J. Hughes.

Chemical Patent Law Course

A LECTURE series on "Patent Law in the Chemical Field" has been announced by the New York Section, American Chemical Society. The series will consist of two-hour lectures, from 7:00-9:00 p.m., each Wednesday from February 28 through May 9, and will be held in the auditorium of the Engineering Societies Bldg., 29 W. 39th St., New York, N. Y. Fee for the course is $10, and applications for enrollment should be sent to Edward S. Todaro, treasurer of the lecture series committee, at Fisher Scientific Co., Eimer & Amend Division, 635 Greenwich St., New York.

The series will include the following 10 lectures: February 28—"What Is Patentable?" Robert Calvert; March 7—"Why Patent? The Rights Conferred and on Whom," Giles S. Rich; March 14—"Preparation of Application and Selection of Inventor," Arthur G. Connolly; March 28—"Patent Claims," Edmund H. O'Brien; April 4—"The Application in the Patent Office," Lawrence C. Kingsland; April 11—"Interferences and Establishment of Date of Invention," Roger T. McLean; April 18—"The Validity of Patents," Theodore S. Kenyon; April 25—"The Patent in Court—Infringement," Clarence G. Galston; May 2—"Fundamental Problems of the Patent Owner and Licensee," W. D. Keith and R. S. Dunham; and May 9—"Organization and Function of an Industrial Patent Department. (a) What the Chemist Should Expect of the Patent Department," W. H. Hutz, and "(b) What the Patent Department Expects of the Chemist," J. Bergin.

Panel Discussion on Rubber Problems

A PANEL discussion on rubber compounding and technology highlighted the January 25 meeting of the Northern California Rubber Group, at the Elks Club, Berkeley, with 39 members and guests attending. Panel members included Richard Claussen, Pioneer Rubber Mills; R. D. Kettering, Oliver Tire & Rubber Co.; D. C. Maddy, Harwick Standard Chemical Co.; R. E. Morris, Mare Island Rubber Laboratory; and P. R. Oliver, Farrel-Birmingham Co., Inc. The following questions and answers were among those discussed by the panel:

Q. How is the proper cure determined for a large article where it is necessary to use a long time at a low temperature to effect the cure?

A. If it is possible to cut samples from various sections of the article, the modulus and swell give a very good indication of the state of cure. Thermocouples inserted in the stock are good, but not too accurate. The per cent. of combined sulfur is a good test, as is the T-50 test for natural rubber.

Q. Which side of a mill is the proper side to load?

A. It is the custom to load on the bull gear side, but it actually does not make a great deal of difference.

Q. Compare rayon and cotton as used in tires.

A. Both rayon and cotton make excellent tires. Rayon is stronger and, therefore, makes a lighter tire. Rayon also produces less heat build-up.

Q. Where is nitrogen used in rubber compounding?

A. It is used as a blowing agent for sponge rubber.

Q. Compare the bonding of natural rubber and GR-S to steel.

A. Natural rubber makes the better bond because it is stronger. The GR-S bond is probably two-thirds as good because of the low tear resistance of GR-S. Actually, the bonds are about equal, but the GR-S itself fails before natural rubber. It might be a good idea to bond a layer of natural rubber to the metal and then add a GR-S cover.

Q. What is the best surface for adhesion of rubber to metal?

A. The best surface is a polished one, and it is also essential that the metal surface be clean. Where a hard rubber base is to be used, a machined surface is satisfactory because it adds strength to the mechanical bond.

Q. Should water always be circulated through the rotors of a Banbury?

A. Yes, especially on a new Banbury to prevent the journals from expanding and damaging the bearings.

Q. What items are important in reproducing the results of an ozone test?

A. The most important item is the ozone concentration which must be kept constant at the test level and is accomplished by means of a constant rate of air circulation. The samples to be tested should have a uniform conditioning period, such as 10 hours at 100° F., to allow the blooming of protective agents.

Q. What are good spacers or interliners for rubber stocks?

A. Holland cloth and polyethylene are satisfactory. Silicone treated paper is excellent in the laboratory, but as yet has not been evaluated in the factory.

Q. How can you keep Silene EF from settling in Neoprene AC cements?

A. If the cement has been properly made and the Silene still settles, not much can be done. It is thought that the neoprene receives the benefit of the Silene during processing so that the loss from settling is not too important. This settling of pigments is an old problem, especially with sulfur in natural rubber cements used for tire recapping work where it is sometimes possible to make hard rubber from the small amount of cement remaining in the bottom of a drum.

In the business session preceding the panel discussion, the election of the following new officers for 1951 was announced: president, John B. Watson, Goodyear Rubber Co.; vice president, Neil McIntyre, Oliver Tire; secretary, Grover S. Ramsey, Grove Regulator Co.; and treasurer, James A. Sanford, American Rubber Mfg. Co. Mr. Watson announced the appointment of the following committees: membership, H. C. Burke, Burke Rubber Co.; reception, Herbert Wiley, Pioneer Rubber, assisted by Eugene Foubert, Sacoma Mfg. Co., and E. J. Lycett, Goodyear Rubber; publicity, Mr. Ramsey; and by-laws, F. W. Swain, Pioneer Rubber, assisted by Mr. Kettering, G. B. Farwell, Goodyear Rubber, and R. J. Henderson, American Rubber.

New Plasticizer Available

THE performance life of all rubber parts and surfaces which have hardened, cracked, and become inelastic with age is said to be greatly prolonged by a rubber plasticizer now being made available to industry by Schwartz Chemical Co., Inc., New York, N. Y. Called Rub-R-Vive, the material is said to plasticize the rubber and impart the feel, grip, resilience, and performance of new rubber when applied by cloth or brush to an old rubber surface. Described as a non-inflammable and non-volatile liquid, the plasticizer is said to be absorbed by the rubber and give a lasting improvement with one application.

The new material is believed to be of great potential interest to office and plant managers for conserving and lengthening the life of rubber products now in use. Rubber feed rollers, platens, friction wheels, teletype rolls, gaskets, hose, windshield wipers, and other rubber products can now be revitalized to give efficient service, it is claimed. Developed two years ago by the company, Rub-R-Vive is being used successfully by the printing industry. The material is said to have excellent shelf life, and its storage does not require a fire department permit. Production is being increased in anticipation of a widespread demand resulting from the tight rubber situation.

Elect Officers for 1951

THE Division of High Polymer Physics of the American Physical Society has announced that as a result of an election conducted in December, 1950, officers of the Division for 1951 are as follows: chairman, J. Burton Nichols, E. I. du Pont de Nemours & Co., Inc.; vice chairman, Maurice L. Huggins, Eastman Kodak Co.; and secretary-treasurer, W. James Lyons, Firestone Tire & Rubber Co.

Synthetic Rubber Process

A TALK by E. J. Buckler, Polymer Corp., Ltd., on "The Hydrocarbon Chemistry behind the Manufacture of Synthetic Rubber in Canada" featured the January 18 dinner-meeting of the Quebec Rubber & Plastics Group. Some 93 members and guests were present at the meeting at the Queen's Hotel, Montreal, P.Q., Canada.

Using slides to illustrate his talk, Dr. Buckler noted that synthetic rubber manufacture in Canada is a by-product industry. For each pound of Polysar S manufactured it is necessary to process about 100 pounds of petroleum through all stages of oil refining to yield the light hydrocarbon feed stocks needed for butadiene production and to coke 20 pounds of coal to give the benzene required for the styrene component.

The light hydrocarbons are roughly separated by low-temperature, high-pressure fractionation into fuel gas, ethylene, and the family of four-carbon atom hydrocarbons. This last fraction is then extracted with sulfuric acid to separate isobutylene, used for the manufacture of Butyl rubber, and the residue submitted to extractive distillation in the presence of acetone and water to yield butane for gasoline blending, and normal butylenes used in the manufacture of butadiene. Butadiene is produced by high-temperature catalytic cracking of n-butylenes in the presence of steam, followed by purification of the reaction products first by fractional distillation, and finally by selective absorption of butadiene in copper ammonium acetate solution. Styrene is manufactured by alkylating benzene with the ethylene previously separated, and catalytically cracking the ethyl benzene produced to yield crude styrene, which is refined by vacuum fractionation.

In the initial stages of the whole process the major products are the responsibility of the petroleum and the coke oven industries. In the operations conducted by Polymer Corp., described in the preceding paragraph, the non-rubber products manufactured amount to a total of seven pounds for each pound of Polysar S produced and include fuel gas, butane, styrene monomer, Butyl rubber, ethylene, isobutylene, and toluene. In addition, there is a substantial sale of steam to other industries and electric power to the Hydro-Electric Power Commission of Ontario. This diversification has been carried out in the last five years as the major part of the program to render synthetic rubber manufacture in Canada economically sound despite the relatively low market price of the rubber.

CCDA Annual Meeting

THE Commercial Chemical Development Association will hold its annual meeting on March 21 at the Roosevelt Hotel, New York, N. Y. Subject of the meeting will be "The Effect of Government Regulations on Commercial Chemical Development," with outstanding representatives of government and industry scheduled to speak. The subject is extremely important and timely, and the primary objective of the meeting is to bring about a better understanding of both industry's and government's position in this matter. The meeting is open to all interested persons.

Tires Discussed by SAE

THREE papers on tires were included in the program of the National Passenger Car, Body, and Materials Meeting of the Society of Automotive Engineers, Inc., held on March 6-8 at the Book-Cadillac Hotel, Detroit, Mich. The papers were: "Tire Wear and Durability," A. W. Bull, United States Rubber Co.; "Tire Noise," W. F. Perkins and W. F. Billingsley, The B. F. Goodrich Co.; and "Riding Comfort," R. D. Evans, Goodyear Tire & Rubber Co.

Dr. Bull said that tread wear is a complicated phenomenon affected by a great number of variables, and tread wear evaluation tests are correspondingly difficult to devise. The condition of the vehicle, the operating terrain and climate, the driver's habits, average load, and tire inflation are important factors in tread wear. Another difficulty is that different types of tread rubbers show different relative resistances to abrasion under different test conditions, particularly when natural and synthetic rubbers are being compared. A thorough knowledge of all these factors and the resources to test under a variety of conditions are needed to determine how to make tires which will best serve the needs of the average customer.

In their discussion of tire noise Perkins and Billingsley noted that this noise is a recognized portion of the total car noise that is controllable by the tire designer. Such noise reduction, however, is limited by the practical aspects of compromise with the demands for anti-skidding, stability, and riding qualities. As a result, the tire with the ultimate in noise reduction will never be acceptable, and, quite possibly, present noise level standards may be exceeded in the future if continued demands for safer vehicle operation are to be met.

After discussing the effect of tire design on riding comfort, Mr. Evans said that tire people have long since learned that modifications of design to enhance ride or other performance quality is invariably paid for by some loss in respect to other desirable characteristics, such as cornering power and overall durability. It is generally true that only through the development of new materials or treatments can enhanced performance in one or more factors be realized without a compensating loss in other factors. It is the job of the designer to juggle and balance these materials into the changing patterns of most acceptable compromise.

Powdered Stearic Acids

ALL grades of Emersol stearic acids are now available in a new "extra fine" powdered form, according to Emery Industries, Inc., Carew Tower, Cincinnati 2, O. These new powders are said to represent the finest particle-size stearic acids available. Laboratory screen tests show that 99.5% of the powder passes through a U. S. #30 sieve (0.0232-inch openings), and 95% through a U. S. #100 sieve (0.0059-inch openings). Typical material previously available had 96% passing through a #30 sieve, and only 70% through a #100 sieve. In most cases this finer particle size improves the performance and increases the efficiency of the stearic acids in their rubber and plastics applications.

Plasticizers for Cold Rubber

"ESTER Plasticizers for Low-Temperature Rubber Compounding" was the title of a talk given by W. A. Woodcock, Carbide & Carbon Chemicals Division, Union Carbide & Carbon Corp., before the January 26 dinner-meeting of the Philadelphia Rubber Group, held in the Poor Richard Club, Philadelphia, Pa., and attended by 120 members and guests.

Mr. Woodcock emphasized that ester plasticizers are the key to the adequate performance of most synthetic rubber compounds at low temperatures. Four types of esters are commonly found in commercial plasticizers; these esters are formed by a combination of (1) a monobasic acid and a monohydric alcohol, (2) a dibasic acid and a monohydric alcohol, (3) a monobasic acid and a dihydric alcohol, or (4) a polybasic acid and a monohydric alcohol.

Work on the effect of chemical structure on the properties of ester plasticizers has shown that (1) esters containing cyclic groups have high densities, poorer low temperature properties, and greater solvent strengths than those containing alkyl groups; (2) linear diesters, particularly those containing branched chain constituents, have better low-temperature properties than U-shaped diesters, but have lower solvent strength for moderately polar polymers at molecular weights that insure non-volatility; (3) alkyl phosphate esters of high molecular weight are superior to linear diesters in low-temperature properties; and (4) many straight-chain linear diesters which have low viscosities at 20° C. have relatively high freezing point.

Investigations relating the swelling effect of ester plasticizers upon vulcanizates with the low-temperature flexibility of the rubber have given the following results: (1) relatively good swelling is a prerequisite for low-temperature flexibility; (2) plasticizers that swell polymers, but have relatively high freezing points are poor for low-temperature flexibility; (3) plasticizers that swell polymers, but have steep viscosity-temperature curves are poor for low-temperature flexibility; and (4) plasticizers showing moderate swelling action on some polymers may be poor in low-temperature flexibility because of reduced compatibility at low temperatures.

In the business session preceding the talk, a slate of candidates for 1951 Group officers was presented by the nominating committee under the chairmanship of B. C. Carlson, L. H. Gilmer Co., division of United States Rubber Co. The slate was approved, and the new officers elected were: chairman, H. J. Reid, Gilmer Co.; vice chairman, T. W. Elkin, Armstrong Cork Co.; secretary-treasurer, George J. Wyrough, R. E. Carroll, Inc.; and directors for three years, R. A. Kurtz, E. I. du Pont de Nemours & Co., Inc., and D. E. Sauser, B. F. Goodrich Chemical Co. Other directors of the Group are C. J. Glaser, Jr., Lee Rubber & Tire Corp.; A. Yarasheński, Army Quartermasters Department; J. B. Johnson, Linear, Inc.; and C. H. Boys, Hercules Powder Co.

Canadian Chemists to Meet

ACCORDING to an announcement from T. L. Davies, secretary-treasurer, Rubber Chemistry Division, Chemical Institute of Canada, a meeting of the Division will be held separate from that of the Institute at the Walper House Hotel, Kitchener, Ont., Friday, June 15. The C.I.C. general conference is scheduled for June 18-20 at Winnipeg, but the executive committee of the Rubber Chemistry Division felt that Winnipeg would be too far afield for the majority of Canadian rubber chemists and technologists as well as American technical men and therefore arranged for the separate meeting in Kitchener.

The Rubber Division meeting will be in the form of a morning technical session featuring four technical papers; while the afternoon will be devoted to two technical papers and a panel discussion on rubber compounding featuring initially a prearranged question and answer period with a board of experts and later, time permitting, an open discussion with questions from the floor. A banquet will be held in the evening, at which it is planned to have a prominent industrialist as guest speaker. The possibility of having a golf outing the following day, Saturday, June 16, is also being investigated.

Further details of this meeting will become available when plans have been finalized. Mr. Davies may be addressed at Polymer Corp., Ltd., Sarnia, Ont.

Buffalo Group Hears Sibley

APPROXIMATELY 35 members and guests of the Buffalo Rubber Group attended a regular meeting on February 6 at the Park Lane Hotel, Buffalo, N. Y. Feature of the afternoon technical session was a talk on "Organic Sulfides as Vulcanizing Agents of Rubber" by R. L. Sibley, Monsanto Chemical Co.

Dr. Sibley discussed work being done at Monsanto on the use of sulfur-bearing compounds, such as morpholine disulfide, as vulcanizing agents for rubber. Formulations and test data were presented comparing morpholine disulfide and sulfur as vulcanizing agents. The speaker stated that studies of this sulfur-bearing compound are being extended, and further work along this line will be published later.

A cocktail hour and dinner followed the technical session. After-dinner speaker was Bernard Wiggen, Buffalo Weather Bureau, who discussed the problems confronting the weatherman.

Winkelmann Speaks

A TALK on "Weather Aging of Automotive Rubber," by H. A. Winkelmann, Dryden Rubber Division, Sheller Mfg. Corp., featured the January 26 session of the Chicago Rubber Group. Some 150 members and guests attended the meeting, which was held at the Hotel Morrison, Chicago, Ill., and included a cocktail hour and dinner.

Dr. Winkelmann's talk was similar to his address before the Detroit Rubber & Plastics Group on October 6, but included additional information on the effect of copper and manganese on the weather aging of rubber products.

The meeting concluded with a drawing for door prizes won by H. E. Andersen, B. F. Goodrich Chemical Co.; Hector Bruder, Advance Rubber Co.; Herman Patt, Big Ben Petroleum Co.; and Robert Rehfeldt, Victor Gasket & Mfg. Co.

[1] India RUBBER WORLD, Nov., 1950, p. 208.

Polyacrylic Rubbers

A TALK on "Polyacrylic Rubbers" by T. L. Gresham, B. F. Goodrich Chemical Co., highlighted the February 16 dinner-meeting of the Detroit Rubber & Plastics Group, Inc. Held at the Detroit-Leland Hotel, Detroit, Mich., the meeting attracted approximately 200 members and guests.

Dr. Gresham stated that the possibility of using polyacrylates as a substitute for rubber came to the attention of Goodrich early in World War II. The discovery of a means for curing the polyacrylates led to the development of the Hycar PA rubbers, which have remarkable resistance to the deteriorating effects of heat, light, and oils. These special properties of the Hycar PA rubbers can be explained as a direct consequence of the chemical nature of the polymeric molecules. The processing and the compounding of the PA rubbers are relatively simple, although the materials and procedures used differ somewhat from those employed for conventional rubbers. The ease of processing and the unusual physical properties of the PA rubbers have resulted in an increasing demand for their use in a wide variety of end-products.

The talk was illustrated by slides and samples of Hycar PA applications shown by Roger Bascom, of Goodrich Chemical, who also assisted Dr. Gresham in answering questions from the floor in the discussion that followed the talk.

Kitchener Group Formed

THE Kitchener Rubber Group has been organized to cover the Stratford, Guelph, Galt, Preston, Elmira, and Kitchener area of Ontario, Canada. The new Group, operating under the auspices of the Wellington-Waterloo Section, C.I.C., will meet monthly during the fall, winter, and spring seasons. The majority of the meetings will be held in Kitchener, and the balance in Galt and the other above-mentioned towns.

The inaugural meeting took place February 20 at the Dominion Tire Co. plant in Kitchener. Some 65 rubber technicians attended the meeting at which W. H. Bechtel, Kaufman Rubber Co., acted as chairman, and R. Smith, Dominion Tire, as secretary. Speakers at the meeting were John Plumb and John Augenstein, both of U. S. Rubber Reclaiming Co., who discussed "Reclaimed Rubber."

The speakers gave a timely and interesting talk on the history of reclaimed rubber, emphasizing its use as a necessary ingredient in rubber products. Newer manufacturing methods for reclaim were discussed and illustrated with slides showing operations at the U. S. Rubber Reclaiming plant in Buffalo, N. Y. The talk concluded with a discussion of the characteristics of present-day reclaims and their place in the manufacture of rubber products, with particular reference to the Kitchener area.

SPE Sections

(*Continued from page* 689)

Tool & Machine Co., have been elected to the board of directors to fill vacancies left by resignations. Mr. Baron also announced the appointment of the following committee chairmen: program, Harold Schwartz, Empire Brushes, Inc.; membership, Russell H. Skidmore, Celanese Corp. of America; house, William Lewi, Dusal Tool & Mold Co.; credentials, Robert N. Boucher, Durite Division, Borden Co.; favors and prizes, Mr. Stott; and publicity, A. M. Merrill, India RUBBER WORLD.

Table favors were distributed through the courtesy of David Guarnaccia of Monsanto, and the meeting closed with a drawing for two door prizes contributed by the Section.

CALENDAR

Mar.	1-31.	Annual Appeal of the American Red Cross.
Mar.	15.	Quebec Rubber & Plastics Group. Queen's Hotel, Montreal, P.Q., Canada.
Mar.	16.	Boston Rubber Group.
Mar.	21.	New York Section, SPE. Hotel Shelburne, New York, N. Y.
Mar.	27.	Washington Rubber Group.
Mar.	30.	New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
Apr.	3.	The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.
Apr.	6.	Akron Rubber Group. Mayflower Hotel, Akron, O.
Apr.	11.	Newark Section, SPE. Military Park Hotel, Newark, N. J. Chicago Section, SPE, and Midwest Chapter, SPI. Builder's Club, Chicago, Ill.
Apr.	17-20.	National Packaging Exposition. Auditorium, Atlantic City, N. J.
Apr.	18.	New York Section, SPE. Hotel Shelburne, New York, N. Y.
Apr.	19.	Quebec Rubber & Plastics Group; SPE; and SPI. Combined Meeting. Queen's Hotel, Montreal, P.Q., Canada.
Apr.	20.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
Apr.	24.	Washington Rubber Group.
Apr.	26-28.	APS, High Polymer Physics. Washington, D. C.
Apr.	30-May 4.	Fourth National Materials Handling Exposition. International Amphitheatre, Chicago, Ill.
May	1.	The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.
May	9	Newark Section, SPE. Military Park Hotel, Newark, N. J. Chicago Section, SPE, and Midwest Chapter, SPI. Builder's Club, Chicago, Ill.
May	16.	New York Section. SPE. Hotel Shelburne, New York, N. Y.
May	22.	Washington Rubber Group.
May	24-25.	Society of the Plastics Industry. Greenbrier Hotel, White Sulphur Springs, W. Va.
June	3-6.	National Association of Purchasing Agents. Waldorf-Astoria Hotel, New York, N. Y.
June	5.	The Los Angeles Rubber Group, Inc., Hotel Mayfair, Los Angeles, Calif.
June	14.	New York Rubber Group. Annual Outing.
June	15.	Akron Rubber Group. Boston Rubber Group. Rubber Chemistry Division, C.I.C. Walper House Hotel, Kitchener, Ont., Canada.
June	18-22.	American Society for Testing Materials. Annual Meeting. Atlantic City, N. J.

Discusses Production Aids

A talk on "Production Aids for Injection Molders," by A. R. Morse, Injection Molders Supply Co., highlighted the January 10 meeting of the Newark Section. Approximately 70 members and guests attended the meeting, which was held at the Military Park Hotel, Newark, N. J., and included a cocktail hour and dinner.

Using slides to illustrate his talk, Mr. Morse discussed several items of interest to injection molders for improving production, including (1) an all-welded heating cylinder which gives increased production at a lower heat input than conventional cylinders; (2) a mold temperature control unit developed by Meridien Plastics; (3) injection machine nozzles incorporating the principle of restricted gating; (4) various types of manually operated gate cutters; and (5) a material transfer unit for high hopper machines.

At the business session preceding the talk, Section President P. W. Simmons, Dow Chemical Co., announced the appointment of the following new committee chairmen for 1951, as follows: publicity, John Groesbeck, American Hard Rubber Co.; credentials, E. W. Spitzig, Newark Die Co.; educational, C. J. Frosch, Bell Telephone Laboratories, Inc.; membership, R. M. Leiter, Celanese Corp. of America; house, C. B. Sanders, Dillon-Beck Mfg. Co.; program, W. H. Willert, Hartig Engineering Co.; and SPE reporter, Anthony Naturale, Thomas Mfg. Co. Table favors were donated by Bestway Products, Inc., and two door prizes were given by Dow Chemical Co.

Crosley and Plastics

The Miami Valley Section began the year with a meeting on January 4, at which the Crosley Division, Avco Mfg. Corp., Cincinnati, O., was host to the group. Following a dinner in the company's dining room, William Graham, Crosley works manager, spoke of the firm's growth, activities, and future plans; Section Member H. L. Brouse described electronic accomplishments by Crosley; and Ralph Benson showed some of the company's household appliances and the extent to which plastics are used in their manufacture. The meeting concluded with a trip through the company's television and radio production line.

Section President M. H. Kasch, Kurz-Kasch, Inc., reported the appointment of the following 1951 committee chairmen: program, C. M. Jensen (for the Dayton area) and R. N. Backscheider, Recto Molded Products, Inc. (for the Cincinnati area); fellowship, M. F. Nelson; professional activities, G. J. Wilson; credentials, C. E. Weber; membership, J. W. Brierley, Bakelite Division, Union Carbide & Carbon Corp.; and publicity, J. L. Russell, National Cash Register Co.

Electroplating Plastics

The Upper Midwest Section held its first regular meeting of the year on January 8 at Esslingers Cafe, St. Paul, Minn. Following the dinner and business session, Jerome Weller, Brown & Bigelow, Inc., spoke on "Electroplating of Plastics."

Mr. Weller described a process for preparing the surfaces of thermoplastic parts prior to plating. Best results are obtained by first using a light sandblast to etch the plastic surface, then using a sensitizing dip in stannous chloride, followed by a flash plating of silver to obtain

(*Continued on page* 728)

NEWS of the MONTH

NPA Revises M-2 Order and Standardizes Product Lines; International Rubber Conference Held in London

The National Production Authority revised its M-2 Order on February 1 to curtail further the amount of new and both natural and synthetic rubber available for the manufacture of rubber goods for civilians. On February 19 a supplement to the revised order restricted the lines and types of tires, hose, belting, wire and cable, and inner tubes manufacturers would be permitted to make.

An international rubber meeting in London, England, began on February 5, but the outlook for restriction of shipments of natural rubber to Communist countries and a lowering of the price of natural rubber seemed unlikely to result from this meeting. International allocation was suggested in this country as a solution to the present natural rubber supply and price situation.

Plans for increased production of cold rubber and the announcement of a cold-rubber plasticizer masterbatch were reported by the Office of Rubber Reserve during February.

Authorization of the construction of 200,000 tons a year additional capacity for the production of GR-S and a revision downward of the government's natural rubber stockpiling plans were recommended by John L. Collyer, of The B. F. Goodrich Co.

The effect of reduced new rubber availability for civilian goods production was apparent in the fabricating industry durng February as reduced work weeks and layoffs were announced. The United Rubber Workers of America, CIO, joined industry management in protesting the curtailment of civilian rubber goods production.

Washington Report

By

ARTHUR J. KRAFT

NPA Rubber Control Actions

The NPA Rubber Division used the year's shortest month to carry its heaviest work load. By Washington's Birthday, February 22, it had produced two orders and was completing work on a third, had reviewed all the allocations and adjustments made under M-2 with a view to a thorough revision, built up its staff to help carry on this job, and reviewed labor problems with leaders of the United Rubber Workers of America.

On February 3 the NPA issued a revision of M-2, made effective as of February 1, which:

1. Pegged consumption of total new rubber in February at 72% of base-period use, as adjusted, and in March at 76%.

2. Limited natural rubber (excluding latex) consumption in February to 43% of the base-period use and in March to 35%.

In effect, this action is expected to reduce new rubber consumption about 12,000 tons in February and about 7,000 tons in March below the January level, estimated at 98,000 tons for civilian and military goods. Natural rubber consumption, including latex, is expected to fall to 35,000 tons in February and 30,000 tons in March. About 8,000 tons of new rubber including about 2,500 tons of natural are estimated requirements for military production in each month. In January about 8,000 tons went into military goods, including 2,000 tons of natural rubber, it is estimated.

The more liberal allowance for new rubber consumption in March, with its sharp slash in the natural rubber component, is based on ORR's forecast of near capacity GR-S output in that month.

3. Gave notice that beginning about February 15 a supplement to M-2 would be issued standardizing production of some products to a single line, type, quality, style, or color.

4. Gave notice that about March 1 it would prohibit, in general, the use of natural rubber and latex "in the manufacture of any of the following products or component or replacement parts therefor: Toys, non-functional household, industrial, and automotive rubber goods which are not essential to the mechanical operation of the equipment involved. Rubber sundries not essential to basic health needs. Floor coverings, mats, and matting. Soles, heels, and sole slabs (new or replacement). Non-functional athletic and sports goods. Inner tubes 8.25 cross-section and smaller."

5. Directs rubber goods manufacturers to increase their camelback production 50% in February and March. This order does not apply to manufacturers whose sole business is making camelback.

6. Adds imported wild rubber from South America to the list of natural rubbers which can be used outside natural rubber consumption limitations.

On February 16, NPA issued Supplement No. 1 to M-2, made effective February 19. The supplement prohibited manufacture of white sidewall tires, a step NPA said will save about 10% of the natural rubber going into such tires.

The manufacture of one line and one quality standard of standard-tread depth passenger-car and truck tires and one line, one quality, extra-tread depth passenger-car and truck tires, only, is permitted. The extra-tread depth tire authorization was a concession by NPA to manufacturers now promoting a "premium" tire. No manufacturer can produce, however, a larger proportion of "premiums" in any calendar quarter than the proportion his "premium" output bore to his total passenger tire output in the last half of 1950.

Permitted also, but in the same quantity as produced on February 19, is the production of special-purpose tires, but the production of farm tractor and implement tires is restricted to one line only. All tires must be black.

Rubber hose must be black except for garden hose, hose for conveying foods, creamery hose covers, and air hose ⅜-inch and under.

Rubber conveyer, elevator, transmission, and V-belts must be black except those used for handling foods or light-colored products which might be marked or discolored by a black belt.

Wire and cable compound for insulations must be black or the natural color of gum rubber; jacket and sheath compounds, black only; other colors are permitted for circuit identification.

Inner tubes can be any color, but only one color for each manufacturer is permitted.

Throughout February the NPA Rubber Division, with the assistance of industry administrators and technicians recruited on a temporary basis while awaiting official appointment, worked steadily along with industry technical committees representing 22 segments of rubber goods manufacture to develop end-product specifications reducing the quantity of natural rubber which can be used in a variety of products.

NPA Rubber Division Director Leland Spencer had called upon the industry early in February to furnish him with seven administrators and seven technicians, and this call was answered. NPA has not yet announced the appointment of a deputy director of the Rubber Division, following the dismissal of Earl Glen late in January. Another government official, associated with rubber studies during the last war, is reported under consideration for the post.

Twice during February, Spencer conferred with L. S. Buckmaster, president of the URWA, and other union officials in Washington. He described the rubber materials situation and the outlook for future supplies. Acknowledging that there will not be adequate rubber available to keep the full labor force operating full time on civilian goods, Spencer urged the union leaders to hold their working force on the job for the time being, accepting two or three months of low earnings, rather than call upon companies to lay off men as provided by contract when the work load fell below a given level per man. Spencer said increased military orders probably will bring work schedules back toward normal in a few months. Tire and other rubber goods manufacturing companies are concerned with the loss of labor force moving to other jobs during the short-term lulls in activity.

In late February, a complete revision of the rubber allocation system was announced by NPA Rubber Division Director Spencer. Allocations will be made on a quarterly basis, and a quarterly ceiling will be placed on total new rubber consumption.

End-product specification control will provide the control of natural rubber used by defining the amount of such rubber that can be used in various products.

Allocation to individual consumers based on the historical use approach is to be eliminated and will instead be based on such factors as plant capacity.

More complete details of this revision may become available after the meeting of the NPA Rubber Division Industry Advisory Committee meeting in Washington on February 26.

T

Throughout 40 years

of rubber reinforcement

MICRONEX

...has been the Old Reliable of Rubber Blacks...used alone, or in combination

• A COLUMBIAN COLLOID •

COLUMBIAN CARBON CO. · BINNEY & SMITH CO.

MANUFACTURER DISTRIBUTOR

MPC (Medium Processing Channel)
STANDARD MICRONEX

◆

EPC (Easy Processing Channel)
MICRONEX W-6

◆

HAF (High Abrasion Furnace)
STATEX-R

◆

FF (Fine Furnace)
STATEX-B

◆

FEF (Fast Extruding Furnace)
STATEX-M

◆

HMF (High Modulus Furnace)
STATEX-93

◆

SRF (Semi-Reinforcing Furnace)
FURNEX

◆

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

NPA Rubber Allocation Investigation

After serving less than a month as deputy director of the NPA Rubber Division, Earl W. Glen was dismissed from that post about January 30 for "administrative failures." Glen had served as chief rubber executive of the United States Department of Commerce for the previous five years, having been relieved as acting director of NPAs' Rubber Division on January 9.

His demotion to deputy director on that date aroused strong protest in some circles, including the independent tire dealers and some small rubber manufacturers. Chairman John Sparkman, of Alabama, announced that his Senate Small Business Committee would investigate the circumstances surrounding Glen's ouster, but it now appears that the likelihood of public hearings on the matter is remote.

NPA Administrator Manly Fleischmann explained that Glen was dismissed for failing to hold down rubber consumption to the limits set in M-2. Official sources have reported only that the Rubber Division, under Glen, had granted excessively large allocations on hardship appeals by some companies in his announced objective of providing each consumer with sufficient quantities of rubber to maintain operations on a five-day, 40-hour week to prevent dissipation of the labor force.

It has been contended that in other cases the use of the same criteria has resulted in smaller allocations than permitted according to base-period use and not always to large-scale consumers.

On February 7, NPA ordered a two-week freeze on rubber allocations in order to review all allocations and adjustments made to date. Observers said that the results of this investigation will necessitate a far-reaching revision of such allocations.

A syndicated news account published a few days before Glen's dismissal contended that three of the "Big Four" rubber companies repeatedly attacked his method of allocation. United States Rubber Co. was reported not a participant.

The other three, it was stated, had basic contracts to supply original equipment tires during the recent all-time peak in such sales. They have argued, it was said, that under M-2 the NPA should allocate allowable rubber usage on the basis of capacity to consume during fiscal 1950.

Apparently in an effort to force the matter to a Senate hearing, the newspaper defense of Glen blossomed into an attack on his successor, Leland D. Spencer. This attack focussed on Spencer's connection with the Goodyear organization and an effort to detract from his record as an economic adviser on decartelization in Germany to Gen. Lucius Clay.

NPA Tire Cord Order

The NPA issued an amendment to Order M-13 on February 15, requiring producers of high-tenacity rayon tire cord yarn to accept "DO" rated orders up to 15% of their scheduled monthly production. Under the original order they were required to book rated defense orders up to 10% of monthly production, and the amendment was issued, NPA said, because some producers had rejected defense orders after fulfilling the 10% quota.

London Rubber Parley

Unusually high imports of natural rubber into Communist China, Hong Kong, and to a lesser degree directly to Russia and the continuing high price of such rubber were considered the main items of discussion at an international rubber conference which began in London on February 5 between major rubber producing and consuming countries. The official purpose of the meeting was given as "a discussion of supplies and demand for natural and synthetic rubber for 1951 and 1952."

A report from Singapore on January 21 said that Communist-financed importers in Hong Kong were buying Malayan rubber in the Singapore market at the rate of 1,000 tons a day at that time. Although it was considered that Communist Chinese were dealing mainly with local Chinese rubber concerns, the fact that some European companies might be filling some Communist orders was not discounted.

A debate on the subject of shipments of Malayan rubber to Communist countries took place in the British House of Commons in mid-February, and the British Minister for Colonial Affairs injected a disquieting note by informing that body that, in the government's view, shipments of Malayan rubber to the Communist bloc in Asia did not exceed normal.

Also, Harold Wilson, president of the British Board of Trade, told the House of Commons:

"We are keeping watch on the situation, and if there are any large undue movements of rubber, we should have to reconsider the position."

Recourse to the January, 1951, issue of the *Rubber Statistical Bulletin*, published by the Secretariat of the Rubber Study Group in London, however, shows that China received 9,302 tons of rubber in November and 7,180 tons in December, 1950, from Malaya, in contrast to the only 10,025 tons received from that source for the first three quarters of 1950 and only 6,990 tons for the entire year 1949. Hong Kong received 23,287 tons of rubber from Malaya in 1949, 19,752 tons during the first three quarters of 1950, and 5,566 tons in November and 7,180 tons in December, 1950. Russia imported 63,414 tons from Malaya in 1949 and 63,422 tons during the first three quarters of 1950.

In addition Warren S. Lockwood, director of the Natural Rubber Bureau in Washington, D. C., which is financed by the British Rubber Development Board, writing in the February issue of *Natural Rubber News*, reported that of total shipments of 104,546 tons of rubber from Malaya in January, 1951, 12,781 tons went to Hong Kong, 2,715 tons directly to Communist China, and 175 tons directly to Russia, for a total of 15,671 tons. In contrast to this relatively high level, the United States was shipped only 30,048 tons, the first time in some years that the United States took less than 30% of total Malayan shipments.

Lockwood suggested in connection with this problem of natural rubber shipments and price the establishment of an international allocation system for this rubber to include "all of the free nations of producers and consumers." He contended that international allocation is "perhaps the most practical solution to provide stability" in the "potentially dangerous situation arising from apparently widespread, but uncoordinated, efforts of many nations to stockpile natural rubber."

He stressed, however, that Malaya alone should not be expected to allocate its supplies, asserting that such unilateral action by a producing nation which provided only 40% of the total rubber produced would be no solution to the problem."

He said the minimum participation should include the following producing countries: Malaya, Indonesia, Ceylon, French Indo-China, Thailand, and Liberia.

Lockwood also suggested that rubber be allocated from producing areas "in accordance with a historical pattern, and insofar as practicable, preserving, within limits, normal trading."

When natural rubber prices exceed the 40 to 60¢ a pound range, as they have in recent months, "abnormal forces have taken over—other than U. S. stockpiling. Heavy buying by Communist countries has probably been the largest single abnormal influence, but certainly not far behind in the parade comes the stockpiling efforts of the free nations other than the U. S.

"If each nation intends to carry a stockpile of natural rubber and goes about acquiring it at a rate of purchase not commensurate with the supply of rubber available," Lockwood warned, "it does not require much imagination to visualize the resultant situation. To carry the matter to an absurdity, if the rest of the world decided to accumulate a three-year stockpile of rubber, approximately 2,400,000 tons of rubber would be required in addition to normal consumption and in addition to United States consumption and stockpiling."

Although much of the information available at the end of February must be classified as informed guessing, the London conference apparently foundered on the question of an American guaranteed price for natural rubber over a long-term period. The American delegation left Washington early in February prepared to discuss the situation which might prevail at the completion of the U. S. stockpile, a situation certain of thorough discussion through the balance of 1951.

Lockwood, in the same article in *Natural Rubber News*, expressed the opinion that both the question of coordinating rubber supply and the prospective overhanging surplus of natural rubber in 1952 must be addressed now. On the question of coordinating supply during the current shortage period, he wrote:

"It would be unfortunate if the present London conference ended without at least a provision for an adequate mechanism to continue discussions of this most vital problem."

On February 16 it was disclosed that an American steamship company, the Pacific Far East Line, ran into keen disappointment in trying to pick up natural rubber at Singapore during January for shipment to the United States.

According to a recommended decision released that day by the Federal Maritime Board, the steamship company related the following story to buttress its argument against Maritime Board approval of a rival steamship company's petition to charter more ships for the Straits to U. S. run.

"The Washington representative of Pacific Far East Line, which operates between the Pacific Coast and the Persian Gulf, including calls at Malaya and Indonesia, testified (in hearings held by Examiner C. W. Robinson, February 5-8) that around the first of January, 1951, his company was asked by General Services Administration to furnish as much tonnage as possible homebound from the Straits to the Pacific Coast, there being approximately 80,000 tons of rubber ready for shipment.

"The company had two of its regular vessels call for the rubber and diverted a third vessel for the same purpose. Although those vessels had available space for approximately 30,000 tons, they were

able to obtain only 1,700 tons of rubber. Two later vessels failed to get any more rubber. Investigation by the company developed that the information as to the amount of rubber available was inaccurate, and that there would not be any large movement of rubber in the next several months, either to the Pacific or the Atlantic coast. This opinion is based upon the facts that the United States does not control the purchase or the movement of rubber, that rubber is purchased on the New York market, the London market, and the Singapore market, and that the bids of the United States have been comparatively unsuccessful as against those of 'Communist-controlled' countries."

Sources well acquainted with the rubber purchasing situation were quick to deny the assertion that "there would not be any large movement" of rubber in the next few months. The expectation is that United States receipts will return to the 75,000-ton level by April, from current levels of between 60,000 and 65,000 tons.

The request by GSA for as much tonnage as possible was made on January 5 and was prompted by an urgent request for such an appeal from the top level of the Munitions Board. The Board, through GSA, backed up its appeal by the promise of armed military convoys to protect merchant ships, if the Communist threat which then appeared imminent (to the Munitions Board, at least) should necessitate that.

In January particularly, scheduling of vessels in and out of Singapore had been rather haphazard, often producing a glut when relatively little rubber was at the port and conversely being absent when rubber was waiting at the docks for shipment. This situation, rather than a shortage of rubber, probably was responsible for the Pacific Far East Line's experience, according to these sources.

Cold Rubber Production Plans

Plans to increase cold rubber GR-S production to approximately 340,000 long tons a year were disclosed January 31 by the Senate Armed Services Preparedness subcommittee. Its chairman, Sen. Lyndon B. Johnson (D., Tex.) said he had been advised by ORR of plans to increase the annual output by about 120,000 long tons a year. He said this increase would bring total production of cold rubber to 340,000 tons, all within the 760,000-ton general-purpose synthetic rubber goal set last September.

Johnson said the program should provide enough best-quality tire tread synthetic rubber for the Armed Forces requirements and also to satisfy civilian demand. The "green light" had been given, at the time of the subcommittee's announcement, for the definite conversion from previous types of GR-S to types of cold rubber GR-S at the following locations and in the quantities indicated: Los Angeles, Calif., 30,000 long tons, operated by Minnesota Mining & Mfg. Co. and Pacific Rubber Co.; Port Neches, Tex., 15,000 tons, B. F. Goodrich; Naugatuck, Conn., 13,000 tons, U. S. Rubber; Baton Rouge, La., 7,500 tons Copolymer Corp.

Other conversions for which plans "at the moment are not fully developed" involve the following facilities and capacities: Port Neches, 30,000, U. S. Rubber; Akron, 12,000, Goodyear Tire & Rubber Co.; Lake Charles, La., 7,500, Firestone Tire & Rubber Co.; and Houston Tex., 7,500, Goodyear. The conversion being considered at Akron is still in the preliminary planning stage, and conversion of an equivalent tonnage may be made at another copolymer plant, the subcommittee said.

At the time of its announcement the conversion program promised additional production, definitely planned, of 65,000 tons. The rubber goods manufacturing industry had recommended to NPA and other agencies again in December that half the government's GR-S production be made as cold rubber GR-S, with equivalent action for GR-S latex.

Additional details on the cold rubber program were presented to the Small Business sub-committee of the Senate Banking and Currency Committee on February 7 by Gerald Hadlock, executive director of ORR, who reported that Rubber Reserve is aiming at a production of cold rubber at an annual rate of 320,000 tons. By May three government copolymer facilities in the Gulf area will be making about 25,000 tons of additional cold rubber.

Six reactors transferred from an idle line at the Los Angeles facility some time ago are ready to go into operation at the Copolymer Corp., Baton Rouge facility, Hadlock said. Contracts have been signed by Rubber Reserve to move 12 other reactors from Los Angeles, six to Goodyear at Houston and six to Firestone at Lake Charles. These 18 units have a design capacity of 22,500 tons a year.

Hadlock said that Rubber Reserve has already authorized the operators at the Los Angeles copolymer plant to spend $1,000,000 to convert 30,000 tons, or half, their current design capacity for GR-S to cold rubber and about $400,000 to install black masterbatch equipment.

The hearing was prompted by complaints to the Senate subcommittee by the operators of the Los Angeles facilities against the transfer of the 12 reactors to Houston and Lake Charles. They contended that the same reactors could be put to immediate use in making regular GR-S and thus yield more rubber quickly, with less expense, than by the transfer.

Hadlock explained that the 12 reactors were transferred from the Pacific Coast because of economic factors. Rubber Reserve estimates that consumption of GR-S west of the Rocky Mountains will not exceed 65,000 tons in 1951 and therefore argued against increasing production there to 75,000 tons by the quickest means.

Moreover, Hadlock said, any additional rubber produced on the Pacific Coast would require the importation of feedstocks and the shipment of finished rubber to more easterly consuming points, all involving expenses which would not be incurred by installing additional production closer to consuming areas.

As for the choice between a quick increase in the production of regular GR-S as against a somewhat slower increase in cold rubber, Hadlock declared that the rubber goods manufacturers "do not want regular GR-S, but prefer cold rubber because the latter type gives them higher quality products."

"All the big companies," he told the subcommittee, "want us to supply 75% of their GR-S in the form of cold rubber. Soon, the National Production Authority will make them go back to using only 25,000 tons of natural rubber a month. If they have to substitute for natural, they want the best substitute they can get," Hadlock reported.

Other Rubber Reserve Actions

ORR, as recounted here during the past two months, ran into serious difficulty, mostly from the weather, in keeping its reactivation program on schedule, with resultant heavy losses in tonnages of GR-S produced. On February 7, Hadlock informed a Senate committee, however, that GR-S output will be within "three or four thousand tons" of the projected 760,000-ton annual rate in March, picking up the gap in May.

Hadlock made the announcement in testifying before the Senate Banking and Currency Committee's subcommittee on Small Business, headed by Sen. J. Allen Frear, Jr., of Delaware. He disclosed also that a Munitions Board task group of government personnel was about to transmit a report to Board Chairman John D. Small on this country's rubber position.

"It is my understanding," Hadlock told the Senators, "that the study will show that we have enough synthetic and natural rubber, after stockpiling, to take care of normal civilian requirements."

The report, intended for transmittal by Small to Mobilization Director Charles E. Wilson, has not been made public. The conclusion reached in the report would seem to indicate that the Munitions Board sees no need of building more synthetic rubber capacity.

Hadlock also reported to the Senators on Rubber Reserve's efforts to get small business to participate in the synthetic rubber program, an effort that has yielded some success and is still continuing. Small rubber companies, he said, are operating government copolymer plants which produce about 10% of the total GR-S, a proportion which Senator John Sparkman, a subcommittee member and chairman of the Select Committee on Small Business, found "fair."

Sparkman questioned Hadlock on the 150,000-ton design capacity of copolymer facilities operated by B. F. Goodrich Chemical Co., a tonnage larger than the aggregate for small company operators. Hadlock compared one of these plants, the 90,000-ton Institute, W. Va., facility to "a battleship—it's there to use when you need it:" He indicated that if GR-S production should ever be cut back, the first reduction would come at the Institute plant.

C. Edward Rowe, vice chairman of the Reconstruction Finance Corp., told the Senator, "We've brought small business into the program, but I'll admit they're not satisfied. If they take an interest in the managing end of the business instead of the fee only they'll get some experience. They should be in a stronger position in another year."

He said Rubber Reserve set originally to bring all the 18 companies making tires and tubes into its program and that two copolymer plants operated exclusively by small business have an effective capacity of 82,500 tons. Eight companies are in the Copolymer Corp., operating 45,000 tons at Baton Rouge, and ten are in the Kentucky Synthetic Rubber Corp., operating 37,500 tons at Louisville.

Hadlock reported also that ORR has been successful in reducing by about 50% the fees the government pays to contract operators of its rubber facilities. Under the new fee schedule, he said, operators receive $375,000 as a fee for the first 30,000 tons each produces. Under the old fee schedule, the fee was about $550,000 for the equivalent tonnage, he told the committee. Contracts incorporating the new fee schedule are now being signed.

Goodyear and ORR Announce New Synthetic

Goodyear announced on February 19 that it had developed a new type of synthetic rubber which promises to increase

synthetic rubber production 20 to 25%. The new rubber was said to combine the best features of cold rubber GR-S and the German Buna used during the last war.

Thus far, the new-type rubber has been made only in the laboratory, but actual production tests will start soon in the Goodyear operated GR-S plant in Houston.

On February 21, ORR confirmed the Goodyear announcement and said that production of GR-S-X, as the new-type rubber is called, would start soon, It was further revealed that GR-S-X was cold rubber to which plasticizer oil had been added in a manner similar to the production of GR-S black masterbatches.

Improvement in the quantity of synthetic rubber, not in quality, was claimed. A negligible difference between the cold rubber-oil masterbatch and cold rubber to which plasticizer oil was added in the compounding operations was reported.

Other Industry News

Firestone on Rubber and Defense

In a talk before the Chamber of Commerce of the State of New York in New York, N. Y., on February 1, Harvey S. Firestone, Jr., chairman of the Firestone company, said that in March of this year all the synthetic rubber plants in the United States should be in operation, and, as soon as they get up to capacity production, they should be turning out synthetic rubber at the rate of a million tons a year.

"Under these circumstances," he said, "it appears that there will be an ample supply of rubber to meet all essential civilian needs without rationing rubber products and, at the same time, to fulfill all of our defense requirements."

He warned, however, that "further rubber conservation may become necessary if World War III should break out, if more serious trouble should develop in the rubber producing areas of the Far East, or if greater expansion of our defense needs becomes imperative."

Mr. Firestone pointed out that motorists were fortunate because there had never been so many good tires on the 35,000,000 motor vehicles on the road. He attributed this condition to the recent "high rate of new automobile production and the tremendous sale of replacement tires in 1950."

"The industry's production outlook for next year depends upon available supplies of rubber far more than on the usual factors of customer demand and buying power," Mr. Firestone continued. "However, with all synthetic rubber plants operating at capacity and increased orders for military tires and other defense products, the rubber industry should operate at a high level in 1951.

"One of the greatest needs of our country and its allies is increased production; more war materials, more civilian goods and more agricultural products, not only here in the United States, but also among our friends abroad. Only through increased production can we strengthen our international position and, at the same time, maintain the health of our domestic economy: And, mark this well, we *must do both!* Our adversaries are just as aggressive in their efforts to undermine our economy and bring our standard of living down to their level as they are in building an arsenal for war," warned Mr. Firestone.

It was pointed out that our expanded synthetic rubber output should enable us to supply synthetic rubber to our foreign friends which would put them in a position to contribute to our vital natural rubber stockpile by the substitution of synthetic rubber for natural rubber in their own products.

Furthermore, we could expedite the desired results of making more synthetic rubber available abroad by rehabilitating under our control the synthetic rubber plants in Germany. It seems to him particularly unfortunate that the German synthetic rubber plant in the Russian zone has been producing at full capacity since the end of the war, while the synthetic rubber plants in the other zones are still idle, Mr. Firestone added.

Collyer for More Synthetic Plants

John L. Collyer, president of the Goodrich company, on February 8, urged that the government authorize immediately the building of plants to add 200,000 tons a year to the supply of general-purpose American synthetic rubber. Collyer said that this action is needed to deal promptly with situations created by the national defense mobilization program and pressures which are needlessly costing the American people tens of millions of dollars a year.

He said his recommendation was based on the following facts:

1. By vote of Congress the government has retained a monopoly in the production of American synthetic rubber. It is carrying the full responsibility for providing supplies which are adequate to meet the needs and protect the interests of the American people.

2. As a part of the mobilization program, government is engaged in accumulating crude natural rubber for stockpiling purposes.

3. Buying for the stockpile is a serious problem now because of unusual purchases of natural rubber being made by other nations, including Russia and Communist China.

4. Our military plans are presumed to be based on the premise that in the event of war with Russia little or no natural rubber, which is needed for the manufacture of large truck and bus tires, would reach our shores. In such an event, moreover, the United States would be called upon to supply enormous quantities of rubber and rubber products to our Allies.

The only apparent reason for increasing further the government stockpile of natural rubber is this desire to be assured of adequate supplies at some time in the future. The stockpile already is adequate to supply the military and essential civilian needs of the United States alone for a five-year war.

6. Current demand for natural rubber, reflecting consumption and stockpiling needs and active speculation, exceeds the available supply. This point is proved by the fact that natural rubber is selling at 70¢ a pound, as compared to 20¢ a pound at the beginning of 1950.

7. This increase of 350% in price means that the American people are paying tens of millions of dollars more a year for rubber products than is justified.

8. An increase of 200,000 tons capacity for the production of American synthetic rubber, authorized immediately by the government, would relax the necessity of large-scale purchases at inflated prices of additional natural rubber for stockpiling.

Collyer pointed out that the world supply of natural rubber and American synthetic rubber in 1951 may reach 2,500,000 tons unless there is interference with the production and the shipment of natural rubber from the Far East. Normally this should be adequate to meet world consumption needs, he said.

"Other countries are not cutting down on their use of rubber, however, as is the United States. Our plants for the production of tires and other rubber products are now operating at only 75% of capacity because of our government's order restricting consumption to make rubber available for the government stockpile. Substantial layoffs of skilled labor are already taking effect," Collyer declared.

Mention was aso made of the fact that even with the extremely tight supply-demand position no action has been taken to put into operation the idle synthetic rubber plant in western Germany. It was also emphasized that much of the natural rubber that the United States should be receiving is going to Russia and Communist China.

"The immediate construction of additional plants and provision of raw materials for the production of American synthetic rubber will make more certain the rubber supply for defense and civilian needs. By increasing the world supply of rubber it will influence substantially the price of natural rubber and thereby remove from the already hard-hit American consumer the extra weight of paying unwarranted high prices for tires and other rubber products," Collyer concluded.

Collyer on ESA Committee

The Economic Stabilization Agency announced in Washington, on February 21, that Mr. Collyer had accepted membership on that agency's labor-management advisory committee. This committee meets with Eric Johnston, ESA director on the first Wednesday of each month.

Mr. Collyer replaces Lewis H. Brown, of Johns-Manville Corp., who resigned because of the pressure of other business. Other members of the committee are Ben Fairless, U. S. Steel Corp.; William Green, American Federation of Labor; A. J. Haws, International Association of Machinists ; John L. Lewis, United Mine Workers Union; Phil Murray, CIO; Fowler McCormick, International Harvester Corp.; and Chas. S. Wilson, General Motors Corp.

Rubber Curbs and Employment

It became apparent in mid-February that government orders curtailing the amount of new rubber to be used in making civilian goods were causing some unemployment and threatening a reduction in working forces in the industry from high levels of the latter half of 1950. The full effect of M-2 was being felt by most of the industry for the first time.

Up to February 22 actual layoffs among the major rubber companies had not taken place since union contracts generally provide for reduced work schedules for all employes before any workers are dismissed.

Goodrich announced on February 15, however, that it was preparing to lay off 1,500 production employes in Akron between February 23 and March 1 because of an acute shortage of rubber. Other Akron companies reported they were hopeful of maintaining their present staffs, at least for the time being. It is understood that in Goodrich plants in other cities the cutback in operations is being met by operating on shorter hours or taking paid vacations.

Goodrich informed its management personnel in Akron that during the first two weeks of February several discussions were held by the company and the local URWA union officials "to determine the most practical manner of meeting the reduced work schedules."

"The company suggested several programs for adjusting the work force, including the possibility of using vacations to meet the reduced hours, while at the same time resulting in the layoff of the minimum number of B. F. Goodrich men and women," the company announcement said.

"After consideration of these programs, and after analyzing the probable duration of the rubber shortage, it was concluded that a special work-sharing program is not advisable."

Layoffs, therefore, will be made without deviation from the normal procedure as set forth in the contract with the union, it was pointed out.

The president of the international URWA union and other union officials met with NPA Rubber Division Director Spencer in Washington during the first part of February in order to find out the reasons for unemployment in Akron and in other parts of the country brought on by the short rubber supply.

"The threat of widespread unemployment cutbacks appears imminent as a result of curtailed rubber supplies," the URWA officials stated after this meeting.

Another meeting with Spencer was scheduled for February 23 in Washington to keep union officials abreast of latest developments on this matter.

As pointed out by Joseph E. Kuebler, in the *Akron Beacon Journal* on February 18, rubber goods manufacturers find themselves in a difficult spot in protesting the severity of the government's cutback of rubber for civilian use.

There is no doubt in their minds that government officials are going "overboard" in stockpiling rubber for defense purposes. The general feeling is that the government's stockpiling program is not only "unrealistic," but "fantastic."

Industry faces a dilemma. If it raises its voice too loudly in fighting for additional rubber to keep its plants running until we get out of the muddle transition period, it may be accused of being unpatriotic. On the other hand, if it does not present its case, it will be forced to lay off thousands of workers who have thousands of dependents. These same workers will undoubtedly be badly needed a few months hence.

It is going to take more than the protests from workers and their employers in the industry to get rubber allocation and use on a more equitable basis for all concerned. No one can expect to escape some of the hardships that go with a defense period.

Another letter by Collyer of Goodrich to Mobilization Director Wilson, during the week of February 12, stressed the fact that natural rubber stockpile objectives may be found too high if defense planners took into consideration the advances made in the use of synthetic rubber since the last war.

"During the first half of 1945, the new rubber used in the United States was 14.2% natural rubber and 85.8% synthetic rubber," he said. "In an all-out future emergency, our industry could equal or better the performance of 1945."

Dayton Rubber Co., in a publication sent its dealers during the latter half of February, stated that there will probably be a serious shortage of rubber for transportation in the last nine months of 1951. This company said the government has indicated the amount of new rubber available for tire and inner tube production for the transportation industry will be about 21% short of the needs in the last three quarters of this year.

If the shortage was all applied against passenger tire production, the tire industry would be some 20 to 22 million tires short of customer needs. If the shortage was applied against both truck and passenger tire production, the shortage might amount to 2,500,000 truck tires and some 10 to 12 million passenger tires, the company said.

In view of these facts Dayton stressed the need of conserving the 250 million tires now on automobiles, trucks, buses, and tractors.

1950 Record Tire Year

According to the December report of The Rubber Manufacturers Association, Inc., manufacturers' shipments of passenger-car tires during 1950 reached a new all-time high, 84,657,679 units, as compared with 74,109,453 units during 1947, the previous high, and 65,076,720 during 1949.

Production of passenger tires during 1950 was 78,621,811, contrasted with 65,140,287 during 1949 and 77,795,299 in 1947, again the previous high. Inventories at the end of 1950 had dropped to 3,032,539 units from 8,903,731 at the end of 1949.

Shipments of truck and bus tires during 1950 were substantially higher than in 1949. The respective figures were 15,167,858 and 11,440,316 units. Production of 14,127,791 truck and bus tires was 2,899,351 units higher than in 1949. Inventories declined from 1,734,456 units at the end of 1949 to 737,190 units at the end of 1950.

December shipments of passenger tires were 6,263,058 units, slightly higher than the 6,246,703 units shipped during November; while production was off 10.9% to 5,635,980 units from 6,326,911 units in November.

Shipments of truck and bus tires during December rose 4.2% to 1,309,772 units from 1,256,996 units the month before. Production was down slightly to 1,175,150 units from 1,186,733 units in November.

Molders Protest Styrene Shortage

The Injection Molders Committee for National Defense of the Society of the Plastics Industry met with John R. Steelman, assistant to the President, early in February and also with the Senate Small Business Committee, during the last half of January, to recommend that a small percentage of the styrene being used in the production of synthetic rubber be diverted to polystyrene production so that small injection molders could continue in business until they could obtain some defense orders. It was claimed that the styrene allocated for civilian goods between now and mid-year will be inadequate to provide for plant operations at profitable levels.

Dr. Steelman referred the complaints and recommendations to NPA, ORR, and the Defense Production Administration.

The NPA said that present regulations permit adjustments, on raw materials, in "hardship" cases that have been presented and added that in early February no such "hardship" cases on styrene were outstanding.

A report of the January meeting with the Senate committee was prepared and circulated among the committee members and the NPA, but no relief in the way of additional styrene for injection molders appeared immediately apparent.

The Senate committee is expected to hold hearings with the rubber industry and to check closely as to whether that industry is getting more styrene than absolutely necessary, at the expense of the plastics molders, but such hearings are not expected to take place until mid-March.

EAST

Enters Mill Supplies Field

The mechanical goods division, United States Rubber Co., Rockefeller Center, New York 20, N. Y., has developed and started large-scale production of a new line of specialties made of both plastics and rubber for the $75,000,000 yearly market in textile mill supplies. This line consists of nearly 30 types of specialties for yarn carrying operations and textile machinery, including quills, spindle bumper tubing, lap winder rolls, sand roll covering, warp compressor roll covering, spinner belts, cop butts, spinning and card room cots, tapered warp spinning tubes, spooler sleeves, and other molded and extruded specialties.

"For the past five years we have conducted an extensive research program for the development of new products for the textile industry," said Ernest G. Brown, vice president and general manager of the division.

"The emphasis has been on the application of a new plastic material particularly suited for the textile specialty field. Known as Uscolite, it combines the hardness of plastics with the toughness of rubber. It is extremely tough, almost impossible to shatter.

"Quills made of the plastic, for example, will wear twice as long as wood and will not shatter, chip, or warp. This lowers maintenance costs.

"Production facilities for the plastic have been doubled at the division's Passaic, N. J., plant in order to provide the productive capacity for the new specialties," Mr. Brown added.

Sales and technical service for the new specialties will be handled by the Passaic plant technical service department under the direction of Byron W. Bender. This department has been expanded to offer mills products specifically engineered to their needs.

A new branch office has also been opened at 611 W. Fifth St., Charlotte, N. C., under the supervision of C. F. Cline, Jr., to provide service for southern mills.

Reactivates Ordnance Works

U. S. Rubber on February 1 signed a contract with the Army Corps of Engineers to reactivate the huge Kankakee, Ill., ordnance works for the manufacture of high explosives. Work of reactivation started immediately under the supervision of the company's Naugatuck Chemical Division. Production is scheduled to start within 120 days, and initial plans call for the employment of 600 people, according to John P. Coe, company vice president and general manager of the Division. The Kankakee works, one of the largest in the nation, was built in September, 1941, and operated by U. S. Rubber from April 1, 1944, until production of explosives was discontinued in late 1945.

Advances Personnel

William A. Singleterry has been appointed general control manager of the textile division. He will have his headquarters at the company's general offices in Rockefeller Center, New York.

Mr. Singleterry joined U. S. Rubber in 1933 as paymaster at Winnsboro Mills, Winnsboro, S. C., was transferred to Stark Mills, Hogansville, Ga., in 1934, as

cost accountant, became office manager of the company's mills in Shelbyville, Tenn., in 1937 and was appointed office manager at Winnsboro in 1946.

J. J. Milam has been appointed purchasing agent of the textile division and in addition to these duties will handle waste sales for the division. His headquarters will be at Stark Mills, Hogansville, Ga. Mr. Milam joined U. S. Rubber in 1940 at Hogansville, handling production scheduling. He was transferred to New York in 1941 and placed in charge of sales and production coordination. In 1949 he was appointed assistant to the general sales manager of the textile division.

Charles S. Fowler has been appointed merchandise coordinator of the company's textile division, with headquarters at the general offices in Rockefeller Center. Mr. Fowler has been affiliated with the textile industry during his entire business carrer.

Max A. Minnig

Witco's Defense Division

Witco Chemical Co., 295 Madison Ave., New York 17, N. Y., has established a defense products division within its organization to coordinate defense efforts throughout the company. The objective of the division is to supply government agencies with information requested regarding productive capacity, schedule of operations, and personnel available for investigation of new processes and products. This new division will cover all of Witco's manufacturing facilities located throughout the country and will provide information from one central point covering the company's various activities.

Minnig Elected Vice President

Max A. Minnig, sales manager of the company's carbon black division at Akron, O., has been named special assistant to the president in all carbon black matters. In addition Mr. Minnig has been elected vice president of Witco Chemical Co. in charge of the carbon black division. He will make his headquarters at the company's offices in New York. Mr. Minnig since World War II has been associated with Continental and Witco Carbon companies in Amarillo, Tex., as manager of their gas department. In August, 1949, he was appointed sales manager of Witco's carbon black division, with headquarters at Akron.

K. C. Gardner, Jr.

Gardner Board Member

K. C. Gardner, Jr., vice president in charge of operations for United Engineering & Foundry Co., 948 Duquesne Way, Pittsburgh 22, Pa., was elected a member of the board of directors and of the executive committee at a recent board meeting.

He came to United in 1933 and a few years later was assigned to the Ford Motor Co. in charge of service on the rolling mill project. Next he became technical supervisor of installation and construction at a plant at Ebbw Vale, Wales. In 1937, Mr. Gardner accepted the position as proposal department supervisor and the following year, manager of the foreign department. In 1940 he was appointed supervisor of erection, engineering, purchasing and contracts for the Reynolds Aluminum Mill Project at Listerhill, Ala. Following this he was chief engineer at the Trentwood Aluminum Mill Project, Spokane, Wash. He assumed the duties of assistant superintendent of United's Youngstown plant in June, 1943, and in 1944 was project engineer for the Shell Lines at United's New Castle, Pa., plant. In 1945, Mr. Gardner was named assistant to the general manager of the company and in January, 1946, vice president in charge of operations.

At the same directors' meeting C. W. Correll was elected assistant treasurer of United Engineering & Foundry Co. Mr. Correll joined the company at its Canton plant in 1918 as receiving clerk and was plant auditor there from 1939 to 1944. From Canton he went to the New Castle Shell Line during the war for a few months, and to the ordnance plant in Youngstown as auditor. He was appointed plant auditor there on January 1, 1946.

Sun Rubber Elections

Thomas W. Smith, Jr., one of the founders of The Sun Rubber Co., Barberton, O., and its general manager, has been named president and treasurer. He succeeds the late John T. McLane as president.

Smith's appointment, and the naming of other officers and directors took place February 7, date of the annual meeting of company stockholders and the organizing meeting of the directors.

Other officers named are: Joseph L. McLane, vice president; Chester C. Lile, vice president in charge of production; Wm. R. Lantz, vice president, director of purchases; Tom B. Roberts, vice president, sales promotion; Samuel C. Andress, secretary; Walter S. Raymer, Jr., assistant secretary and assistant treasurer; Henry Martin, director of engineering; Philip Stewart, personnel director; and Bernard A. McDermott, director of art and design.

The new organization also lists seven directors, two more than had served on the board previously. They are: Mr. Smith, Chairman; Mr. McLane, Mr. Andress, Sherwin M. Wylie, G. L. Howder, J. Paul Farrell, and Reed H. Albig.

Thomas W. Smith, Jr.

President Smith outlined plans for future company expansion, pointing especially to more aggressive promotion of athletic balls, a field in which Sun was of the pioneers seven years ago; a broadened line of mechanical molded products; the development of new toys; and defense production.

Although Sun has almost doubled its production facilities since World War II, it has never quite been able to keep pace with demand. Currently, Sun's plant has 167,000 square feet of floor space and employs nearly 1,500 workers.

J. Luther (Luke) Sewell, manager of the Cincinnati Reds, has been appointed athletic ball and sporting goods sales promotion consultant at Sun Rubber and will supervise the promotion of the company's new and improved athletic ball and sporting goods line, working closely with jobbers, dealers, and coaches. Sewell, who will also retain his baseball affiliations, for a time had been sales promotion manager of Robbins Tire & Rubber Co.

Forms New Partnership

Harold W. Courtney, William P. Sullivan, and Benjamin C. Hendrickson have formed a new partnership, Courtney, Sullivan & Hendrickson. Located at 155 John St., New York 38, N. Y., the new firm will continue in the business of cargo surveying and appraising, and allied fields. Marshall K. Weidensaul, Jr., and Frank A. Hanley, formerly with Johnson & Courtney, will be associates of the new company.

Geisinger Advanced

Appointment of A. L. Geisinger to a vice presidency in Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, O., was recently announced by President Raymond F. Evans following action by the board of directors. In this new position Mr. Geisinger will have charge of Diamond's activity in the organic chemistry field.

Mr. Geisinger in December, 1919, joined Diamond Alkali at its Pittsburgh headquarters. His first major assignment was direction of Diamond's entry into the silicate business; he designed, supervised construction and later operation of Diamond's first silicate plant at Cincinnati, O., launched in 1921. In ensuing years he filled the same roles in the establishment of five other silicate plants. Along with heading all operations of the silicate division, for many years, he also directed sales of silicate chemicals. During World War II he acted for five years as president of Diakel Corp., another new venture. A joint wartime project of Diamond and M. W. Kellogg Co., Diakel operated a large fluid catalyst producing plant at Cincinnati.

In March, 1948, after Diamond expanded its position in the chromium chemicals field by purchasing Martin Dennis Co., Newark, N. J., Mr. Geisinger relinquished his duties as head of silicate operations to become president of this new division, a position he still holds.

Youmans Succeeds Stevens

The Okonite Co., Passaic, N. J., manufacturer of electrical wires and cables, has made E. D. Youmans vice president in charge of manufacturing and research. Mr. Youmans, previously vice president and technical director, replaces D. R. Stevens, executive vice president, who is retiring from active service after 30 years of managing the company's factory operations, but he will continue on the board of directors.

Mr. Youmans, who will remain in charge of research activities also, started with Okonite in 1913. Well known for his activities in the electrical and the rubber industries, Mr. Youmans has served on many technical committees of the National Electrical Code, the National Electrical Manufacturers' Association, and the United States Army and Navy. He has been active also in technical committees of the American Society for Testing Materials and the American Standards Association and has served on several government advisory committees.

Form New Coating Firm

The formation of a new company, Chemical Rubber Products, Inc., 70-32 84th St., Brooklyn 27, N. Y., has been announced by William S. Sheppard and O. Thomas Martini. Mr. Sheppard was formerly with E. I. du Pont de Nemours & Co., Inc., Cotan Corp., and Vulcan Rubber Products, Inc.; while Mr. Martini was previously associated with Vulcan. The new company, occupying a one-story brick building with a floor area of 6,000 square feet, will confine its activities at present to spreading of natural, GR-S, nitrile, neoprene, and other chemical rubbers of papers and on cotton, nylon, silk, rayon and Fiberglas fabrics.

Moffett Studio

Hermon F. Safford

Ohio Rubber Elections

Election of Franklin G. Smith as chairman and Gen. Hermon F. Safford as president of The Ohio Rubber Co., Willoughby, O., took place at the recent directors' annual meeting.

Hermon F. Safford, Brigadier General U. S. Army retired, joined Ohio Rubber in January, 1946, as executive vice president, following retirement from the United States Army, where he enjoyed a successful career. As rubber director for the entire Ordnance Department, General Safford directed the rapid and successful modification of existing manufacturing practices to permit the increasingly wide production and use of synthetic rubber.

General Safford is a member of The Rubber Manufacturers Association, Inc., the National Association of Manufacturers, the American Ordnance Association, and the American Society for Quality Control, Advisory Council.

Other officers of The Ohio Rubber Co., all reelected, include: C. J. Edwards, vice president — automotive sales, Detroit, Mich.; R. A. Mertz, vice president in charge of manufacturing; Charles K. Arter, secretary; H. J. Bechtold, treasurer and controller; K. N. Carter, sales manager—general sales. R. Dean Thomas is manager of the Long Beach, Calif., plant, and Glen Vermillion is manager of the Conneautville, Pa., plant.

Since 1933, when Mr. Smith became president, the company's net sales have increased from $1,359,570 to $22,819,342. Its employes have increased from 970 to 2,093.

Jack H. Rines has been appointed general sales manager of Pioneer Latex & Chemical Co., and its affiliate, Pioneer Industries, Inc., Lincoln Blvd., Middlesex, N. J.

Goshen Rubber & Mfg. Co., Inc., Goshen, Ind., has changed its name to Goshen Rubber Co., but no other changes in the organization are involved.

Joe L. Lantz has been made sales manager of the firm, assuming sales duties formerly the responsibility of Elmo E. Niccum, who, however, continues as president of the company.

Rubberset Promotes Three

Rubberset Co., Newark 5, N. J., manufacturer of paint and shaving brushes and paint rollers, has appointed Walter R. Daggatt, general sales manager, William M. Franklin, Newark plant manager, and James L. Macwithey, personnel manager, to the posts of vice president within the organization.

Mr. Daggatt joined Rubberset in 1943 as a sales representative on the Pacific Coast. In 1946 he was transferred to Newark as assistant sales manager of the paint brush division, two years later was made head of this division, and in 1950 was named general sales manager, directing all paint and shaving brush sales activities.

Mr. Franklin came to Rubberset in 1940 after several years in the banking business. After working in various departments in the factory, he was appointed plant superintendent in 1942 and in February, 1950, became plant manager in charge of operations at Rubberset's new headquarters at Haynes Ave. in Newark.

Mr. Macwithey started with the company in 1945 as personnel manager. He had been active in the personnel field for a number of years.

Cyanamid Appointments

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., has announced that C. W. Bendigo, for the past five years editor-in-chief of *Textile World Magazine,* has joined Cyanamid's new product development department. His principal assignment will be the studying of current developments in the field of synthetic fibers.

H. C. Little has been appointed director of employe relations of American Cyanamid to succeed E. J. Dempsey, resigned. Mr. Little joined Cyanamid in 1929 as a member of the legal department, but for the past decade has been with the employe relations department.

Richard L. Newman, formerly with Pabco Products, Inc., has joined the technical field service division, pigment department, of Cyanamid's Calco Chemical Division, Bound Brook, N. J.

R. N. Griswold, Cincinnati branch manager, has been appointed Mid-Central regional sales manager, with headquarters at Calco's Cleveland, O., office at 4500 Euclid Ave. Griswold has been with the organization since 1937.

Changes at du Pont

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has named Wm. T. Wood to the new position of assistant manager of the nylon division, in charge of Fiber V operations. For the past three years he was director of production for nylon of the division.

Now appointed to that post is Charles E. Mears, who is succeeded as manager of the nylon plant at Chattanooga, Tenn., by Edgar H. Bleckwell, manufacturing superintendent of the plant.

Charles M. Switzer continues as assistant manager of the nylon division, in charge of nylon.

That division, which also operates plants at Seaford, Del., and Martinsville, Va., has announced plans to build a Fiber V plant at Kingston, N. C. Construction is scheduled to start this year.

Tom B. Nantz

Transfers Personnel

Several key operating personnel appointments at the government synthetic rubber plant at Institute, W. Va., were announced recently by W. I. Burt, vice president—manufacturing, B. F. Goodrich Chemical Co., 324 Rose Bldg., Cleveland 15, O., the plant operator.

Tom B. Nantz, Hycar production manager at Goodrich Chemical's Geon plant at Louisville, Ky., is now plant manager at Institute and will be responsible for the operation of the 90,000-long-ton capacity plant, largest in the GR-S rubber program. Nantz has been with Goodrich since 1937. During World War II he served as manager of technical service at the Lone Star Defense Corp. ordnance plant at Texarkana, Tex., operated by Goodrich for the government. Since 1943, Nantz has held various technical and production supervisory positions in GR-S and Hycar American rubber manufacture at the Louisville GR-S and Geon plants. He served as general foreman at the Louisville plant until 1945, then became production manager of Hycar American rubbers at the Geon plant.

Walter E. Brodine, engineer at the Port Neches GR-S plant, operated by Goodrich Chemical for the government, has been appointed plant engineer at Institute. He joined Goodrich in 1943 and until moving to Institute was engaged at the Texas GR-S plant in contract field construction and engineering design work.

Sigmund S. Michels, also from Port Neches, is technical manager at the Institute plant. With Goodrich since 1942, Michels at Port Neches served mainly in technical supervisory positions.

Anton Vittone, former production manager of vinyl materials at the Louisville plant, is production manager at Institute. He began with Goodrich in 1942 after several years with The Wyandotte Chemicals Corp. Since 1942, Vittone has held various supervisory jobs in the manufacture of GR-S, Hycar American rubber, and Geon polyvinyl chloride. In 1949 he was sent to England on special assignment to British Geon, Ltd., a Goodrich affiliate.

Gerald A. Balzersen is manager of industrial relations at Institute. With 13 years' experience in safety engineering and personnel work, Balzersen since 1947 has been in charge of safety and training programs for all plants of Goodrich Chemical. He started with the organization in 1943 at Port Neches as safety engineer and remained there until 1947, when he went to the Louisville Geon plant as safety and training director.

George R. Erb has been appointed plant auditor at Institute. He has been with Goodrich since 1943.

John R. Mix has been made staff manager at Institute. Starting with the company in 1927, he has worked at the Port Neches GR-S plant, Lone Star Defense Corp. plant, and Plant #3 in Akron, O.

Geon Company Formed in Japan

Arrangements have been concluded between several large Japanese industrial firms and Goodrich Chemical for a newly formed company, Japanese Geon Co., Ltd., to construct facilities in Japan for the manufacture of Geon polyvinyl chloride, it was announced last month by W. S. Richardson, president.

He also said that formation of the new company had been approved by the Japanese Foreign Investment Commission and the Supreme Commander of the Allied Powers (General MacArthur), and construction would begin soon. Engineering design of the new plant and manufacturing techniques will all be furnished by Goodrich Chemical.

Principal stockholders in addition to Goodrich, according to Richardson, are three important Japanese corporations—The Furukawa Electric Co., Ltd., Nippon Light Metal Co., Ltd., and The Yokohama Rubber Co., Ltd., all of Tokyo.

"We believe that manufacture of Geon polyvinyl chloride in Japan from raw materials produced there will be a constructive step toward the necessary revitalization of the Japanese economy," Richardson said. "The proven versatility of Geon polyvinyl chloride in this country and abroad, both in peace and wartime, will now be available to Japanese industries in their rebuilding effort," he added.

The new polyvinyl chloride plant, located at Kambara, approximately 65 miles from Tokyo on Suruga Bay, will be staffed completely by Japanese.

Engineers of Goodrich Chemical are to leave shortly for Tokyo to direct construction and initial operation.

Precision Rubber Products Corp., Dayton, O., manufacturer of "O" ring seals, has added Edward N. Cunningham to its technical sales staff. Mr. Cunningham for the past nine years was a technical sales representative for Enjay Co., Inc., during which time he was closely associated with the early development of nitrile and Butyl types of synthetic rubbers, as well as with active field sales and market development work. Prior to this work, Mr. Cunningham for 12 years did fundamental research, compounding, and development work for The B. F. Goodrich Co. He has also served on several technical committees in the rubber industry whose chief function was to develop rubber specifications for the automotive and aircraft industries. He is an active member of the American Chemical Society and the American Physical Society.

Edward N. Cunningham

Kenneth B. Cary

Changes at Burgess Pigment

Kenneth B. Cary has been appointed vice president of Burgess Pigment Co., executive sales office, 64 Hamilton St., Paterson, N. J., in charge of the rubber and plastics sales division of the company.

Mr. Cary started with the Okonite Co. as a chemist and by 1933 was the firm's chief rubber chemist. Then in 1937 he joined R. T. Vanderbilt Co., where he was in charge of sales to the insulated wire and cable industry. In 1945 he became vice president of Hamilton Laboratories, but later went to Sharples Chemicals, Inc. He resigned in 1949 to become a member of the Burgess technical service and sales staff for the rubber and plastics industries.

John D. McAleer, formerly of Okonite's rubber laboratory and later attached to the New York sales offices of that company, has been added to the staff of Burgess Pigment as a technical sales representative, working from the Paterson offices.

Columbian Carbon Co. will build an oil-type furnace carbon black plant in Eldorado, Ark., capable of producing 36,000,000 pounds of black a year. This plant, expected to be in production early in 1952, is a part of the expansion program of the carbon black industry indicated to the National Production Authority on December 15, 1950.[1]

[1] India Rubber World, Jan., 1951, p. 464.

NEWS ABOUT PEOPLE

Changes at Goodyear

The Goodyear Tire & Rubber Co., Akron, O., last month announced several changes in its chemical division.

A. E. Whitney, Jr., has been named special representative of the division, with headquarters in New York, N. Y. He will offer technical service to customers in the New England and the Middle Atlantic states on Goodyear's Pliovic (vinyl) resins. During the late war Mr. Whitney was actively engaged in work on thin films and coated fabrics at the Polytechnic Institute of Brooklyn, where considerable work was done by the Quartermaster Corps. More recently he spent much time in Goodyear's research and development laboratories, obtaining a thorough grounding in Pliovic resins.

Recent additions to the chemical division staff are I. N. Lanning and J. H. Houlette. Both men, products of the company's training squadrons, have been assigned to duties at Akron before being sent to field offices of the division.

A new $250,000 building has been added to Goodyear's Jackson, Mich., plant to house the machine shop and tube division there. Officials state that the move will raise the potential daily production of the plant 25% on passenger tires and tubes.

Installation of tube presses in the new building is under way. As soon as the tube division and machine shops are operating in the new building, installation of tire building and curing machines will be made in the vacated space in the old buildings.

The new machine shop has been designed to give ultimate ease in operation. The building also will contain new office locations for machine shop and production supervision, adequate locker and shower room facilities, and a complete ventilating system over the tube curing section.

J. M. Huber Corp.'s industrial products department has moved its New York offices to 100 Park Ave., where it occupies the entire twenty-first floor. The industrial products department handles the sales of Huber carbon blacks, rubber and paper clays, and rubber chemicals. The New York sales offices of Huber's ink division, and the company's purchasing and traffic sections are also located in the same offices.

Flintkote Co., 30 Rockefeller Plaza, New York 20, N. Y., has opened an office, in Room 1018, Cafritz Bldg., 1625 I St., N.W., Washington, D.C., for its industrial products division. Hayden A. Glatte, manager of the special products section of Flintkote during World War II, heads up this new office. He has been with Flintkote more than 10 years and had set up its marine products section.

Flintkote's industrial products division is distributing Glasfab membrane for use with the many Flintkote asphalt coatings in waterproofing, roofing maintenance, and tank and pipe protection work. According to A. J. Healey, manager of asphalt products, Glassfab is made with Fiberglas yarn woven into mesh fabric and treated with asphalt. Its high tensile strength, heat and rot resistance, and immunity to dampness make it an ideal reinforcement for both emulsion and cutback asphalt coatings, it is claimed. The membrane is available in widths 2 to 36 inches and in rolls 50 yards long.

Shelburne Studios

George R. Lawson

George R. Lawson, formerly manager of the eastern chemical sales division and rubber division of Sharples Chemicals, Inc., has been appointed general sales manager, with headquarters in the company's offices at 123 S. Broad St., Philadelphia 9, Pa. After graduation from Yale University in 1927, Mr. Lawson spent more than seven years with the Hood Rubber Division, The B. F. Goodrich Co. in Watertown, Mass., later becoming textile chemist with Merrimac Hat Corp. In 1938 he went to the Barrett Division, Allied Chemical & Dye Corp., New York, N. Y., as a technical representative. During his eight years there Lawson handled technical sales on specialty organic chemicals and rubber compounding materials, with two years as head of the rubber laboratory during the war. He joined Sharples in January, 1946, and became manager of the eastern sales division in March of that year.

W. H. Woodrow has joined Hale & Kullgren, Inc., 326 S. Main St., Akron 8, O., as associate and chief engineer. Mr. Woodrow had previously been with Diamond Match Co., Monsanto Chemical Co., Manning, Maxwell & Moore, and Central Paper Co. While with Monsanto, for nine years, he had responsible supervision of all plant projects, engineering design, and economic evaluations for the plastics division. Hale & Kullgren, engaged in engineering activities including the design and the building of machinery and complete processes for the rubber and the plastics industries, is affiliated with The Aetna-Standard Engineering Co., Youngstown,

F. L. Kilbourne, Jr., has joined The Connecticut Hard Rubber Co., New Haven, Conn., as technical director of research and development. Dr. Kilbourne, formerly chief chemist of the Xylos division of Firestone Tire & Rubber Co., will supervice governmental and industrial research contract activities of the company as well as direct new product development in the fields of silicone rubber, coated fabrics, and vibration isolation.

James A. Reid has been granted a leave of absence from his position as assistant director of research for Phillips Petroleum Co., Bartlesville, Okla., to accept appointment by the Reconstruction Finance Corp. as assistant manager, office of production, Washington, D. C. This office handles, among other things, the government synthetic rubber, tin, and abaca programs. Reid joined Phillips in 1933 as a research chemist and subsequently occupied several other research and supervisory positions in the research department. In February, 1943, he was granted leave of absence to join Rubber Reserve Co., where he served two years in an advisory capacity on technical problems in the production of butadiene and other raw materials used in the government synthetic rubber program. On his return to Phillips in November, 1944, he became assistant to the vice president in charge of research and development. He was appointed assistant director of research in May, 1950.

Fred Tweed is now night superintendent of Martin Rubber Co., Inc., Long Branch, N. J., manufacturer of molded, extruded, and lathe cut, soft rubber goods. Mr. Tweed had been with the company several years before resigning in 1944.

H. C. Bugbee, co-editor of *Natural Rubber News*, was on leave of absence during January and February in order to help the Emergency Procurement Service of the General Services Administration in Washington with its accelerated program of natural rubber procurement.

Arthur Peacock has been named assistant secretary-treasurer and controller of Borg-Warner International Corp., Chicago. For the last ten years Mr. Peacock served in North America, Europe, and Asia as a captain in the Canadian Auxiliary War Services.

D. E. Henderson about May 1 will rejoin Associated Rubber, Inc., Quakertown, Pa., as vice president and general manager. For the past three years he has been in charge of a rubber factory in Houston, Tex.

Albert M. Kahn, president of Acme-Hamilton Mfg. Corp., Trenton, N. J., has accepted the chairmanship of the national division of the 1951 United Jewish Appeal campaign.

Correction

In the article, "Vinyl Stabilizers," by H. J. Ratti, in our January issue, the word "lead" should be omitted from the captions on page 452. The correct captions are: "Fig. 1. Heat and Light Aging of Vinyl Test Specimens Containing a Clear Stabilizer of Ordinary Merit"; and "Fig. 2. Heat and Light Aging of Vinyl Test Specimens Containing Good Clear Stabilizer."

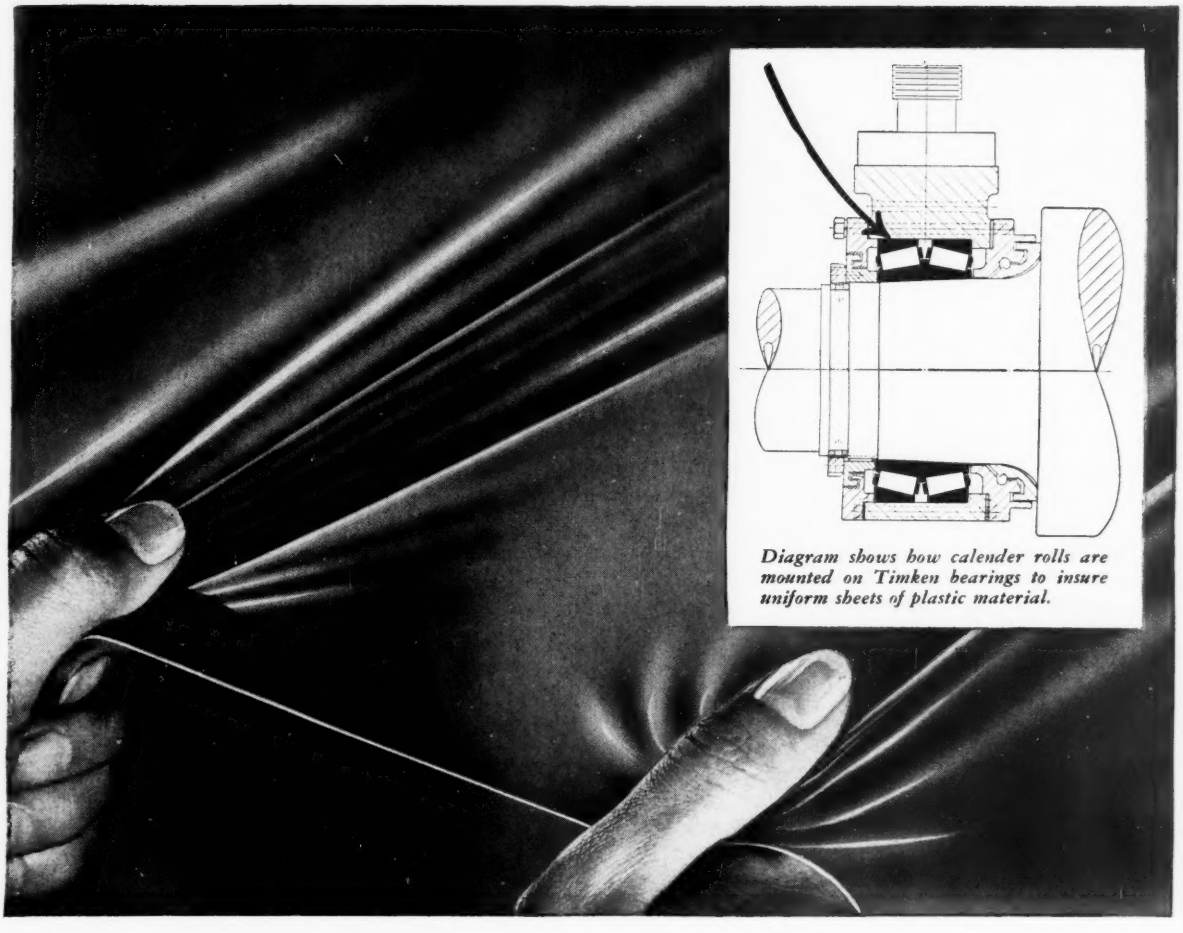


Diagram shows how calender rolls are mounted on Timken bearings to insure uniform sheets of plastic material.

New way to keep film gage under your thumb

PRECISION control of plastic film gage is now possible with calender rolls mounted on Timken® tapered roller bearings. Losses due to rejects and too-thick film are cut to a minimum. And accurate gage control means uniform film thickness with no variation in color shades.

Timken roller bearings can be accurately adjusted at installation to allow for heat expansion of the rolls. Vertical roll movement is minimized, calender precision is maintained because rolls are held in positive alignment. Due to their tapered construction, Timken bearings take any combination of radial and thrust loads.

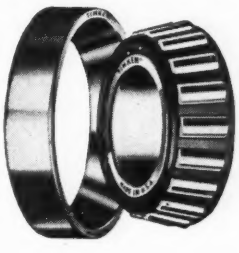
With Timken bearings on your plastics mill equipment, maintenance costs are reduced. Tighter, lubricant-retaining closures are permitted. Roll neck wear is eliminated.

You can be sure of uniform high quality plastics, minimum maintenance costs, fewer rejects, with Timken bearings on your calenders, mills, refiners and mixers. Timken bearings are backed by 50 years of bearing research and development, and are first choice throughout industry. They offer special advantages to you. Write The Timken Roller Bearing Company, Canton 6, Ohio, for full details. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬭ AND THRUST →⬭← LOADS OR ANY COMBINATION →✳←

WEST

New X-Ray Development

General Electric X-Ray Corp., Milwaukee 14, Wis., has announced a revolutionary discovery that promises to make possible the high speed, automatic X-ray inspection of thousands of industrial products, as well as improve the performance of medical X-ray apparatus. The heart of the new inspection system is a crystal or "semi-conductor" which can be grown from a fraction of a millimeter to several millimeters in cubic size. When excited by X-ray radiation the crystal acts as an amplifier tube, amplifying the energy received one million times. Because of the amplifying gain permitted by the crystals, they do the work that hitherto required a much more complex system of vacuum tubes and amplifiers, while at the same time allowing the use of low intensity X-rays.

Use of the crystals as sensitive energy converters and amplifiers is believed to open up a new field of crystal-electric engineering. Pilot-laboratory models have been built to inspect rubber heels, the product level in canned foods, and the continuity of powder trains used in blasting fuses. The crystals can be used to solve many kinds of inspection problems including: (1) checking for absence, misplacement, or misalinement of inserts and other internal parts; (2) detecting voids, cracks, cavitation, and variation in material thickness in a wide variety of homogenous materials; and (3) controlling and checking the product level in containers.

The crystals were grown by Rudolf Frerichs, Northwestern University, working as a consultant with John E. Jacobs of the company's staff. By means of an appropriate relay the new crystal system can be made to operate a meter, chart a graph, work a rejection lever, ring a bell, flash a light, mark the faulty part, or actually stop the production line until the faulty product or process is removed. In general, the new system uses narrow, pencil-like beams of X-rays, rather than the large "spray" emitted by conventional X-ray machines or fluoroscopes, and thus reduces the radiation hazard.

W. P. Willis Jr., has been named plant manager of the Santa Clara, Calif., plant of Monsanto Chemical Co., St. Louis, Mo. Mr. Willis has been with Monsanto since 1941, when he was employed as a research chemist by the I. F. Laucks, Inc., Seattle, Wash., which was acquired by Monsanto in 1944. From October, 1944, to March, 1949, Mr. Willis was sales and service representative of Monsanto's adhesives department at Los Angeles, Calif. In March, 1949, he became branch sales manager for the adhesives and special products department of the western division.

Succeeding Willis at Los Angeles is L. W. Miller, who has been serving as senior sales representative of the special products department there. Mr. Miller was first employed by Laucks in February, 1939, as a member of the coatings sales department in Los Angeles and in 1942 was named sales manager of the Los Angeles branch office, a position which he held until December, 1943, when he entered the service. He returned to the company in March, 1946.

3M Firm Expanding

Recent purchase by Minnesota Mining & Mfg. Co., St. Paul, Minn., of a 114-acre tract in southwest Chicago is part of a long-range industrial development, C. P. Pesek, vice president in charge of engineering, recently announced.

Pesek said a $3,000,000 plant now under construction for Mid-States Gummed Paper Co., a 3M subsidiary, is the initial project in the program. Work on the one-story 265,000-square-foot plant has been under way for several weeks.

Irving McHenry, Mid-States president, said the plant would include research facilities and also would provide ample space for increased production not possible in the firm's present plant at 2515 S. Damen Ave. The new plant is scheduled for partial occupancy September 1 and for complete occupancy January 1, 1952.

Emery Industries, Inc., Carew Tower, Cincinnati 2, O., has announced direct sales and technical service coverage of the West Coast area for the complete line of Emery chemical products: stearic acids, oleic acids, other fatty acids, Plastolein plasticizers, Twitchell textile oils, and soluble oil bases. L. J. Hadobas, who handles this coverage, will operate out of a newly established branch office at 420 Market St., San Francisco 11, Calif. Mr. Hadobas has been with the Emery chemical sales department for several years. Warehouse stocks will be maintained to provide shipments of L.C.L. requirements to West Coast points.

Wenzel A. Lindfors has been appointed factory representative for the New York Belting & Packing Co., Passaic, N. J., in Minnesota, northwest Wisconsin, North and South Dakota, and northern Iowa. He will make his headquarters with W. S. Nott Co. in Minneapolis, Minn., distributer of the company's industrial rubber products.

Carl S. Hoglund has become associated with R. D. Abbott Co., 5107 Anaheim Telegraph Rd., Los Angeles 22, Calif., as technical sales representative. Mr. Hoglund after college was with the New York Central Railroad in New York, N. Y., and Cleveland, O., for a number of years. Then he left Ohio in 1944 and took a position with the Los Angeles plant of Goodyear Tire & Rubber Co. in the technical division of the development department, which he left last month to join Abbott. Hoglund has been active in The Los Angeles Rubber Group, Inc., serving in many capacities including director and secretary; at present he is treasurer.

OBITUARY

J. Newton Smith

AFTER an illness of less than three months J. Newton Smith, president of Boston Woven Hose & Rubber Co., Cambridge, Mass., died at his home in Salem, Mass., on February 5. He had joined the company in 1912 after graduating from Yale University and served successively as vice president, treasurer, and president.

Mr. Smith took an active part in the development of the rubber industry and for many years was a director of The Rubber Manufacturers Association, Inc., and during the late war was on various committees working with the government on rubber problems. The deceased was also a director of several corporations including the National Shawmut Bank of Boston and Liberty Mutual Insurance Co.

He was, furthermore, active in civic affairs, especially in the work of Salem Hospital, of which he was a life trustee. He belonged also to the Union Club of Boston, Yale Club of New York, Eastern Yacht Club of Marblehead, and Salem Country Club.

J. Newton Smith was born in Lynn, Mass., 63 years ago.

Survivors include the widow and two daughters.

Robert B. Williams

ROBERT B. WILLIAMS, 44, for the past two years plant superintendent of the Pennsylvania Rubber Co., Jeannette, Pa., succumbed to a cerebral hemorrhage January 28 after having been stricken at his home the previous day. He had been with the rubber company since 1922.

He leaves his wife, a son, and a daughter.

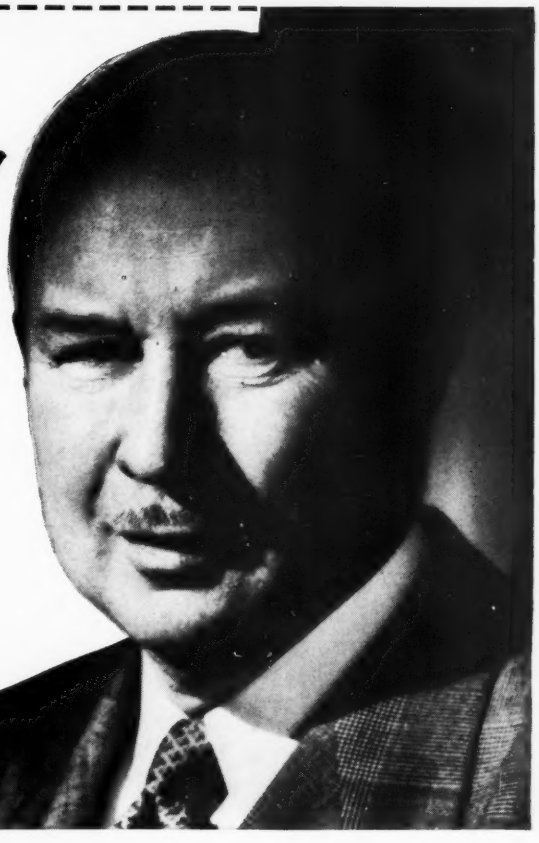
United States Rubber Statistics — November, 1950

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End Stocks
	Production	Imports	Total	Consumption	Exports	
Natural rubber, total	0	68,491	68,491	46,537	604	75,821
Latex, total	0	4,902	4,902	4,803	0	5,837
Rubber and latex, total	0	73,393	73,393	51,340	604	81,658
Synthetic rubbers, total	*41,371 †7046	1,971	50,388	48,261	578	51,636
GR-S types	*36,117 †1,027	1,598	38,742	37,518	6	36,192
Butyl	*5,254	373	5,627	6,013	0	6,727
Neoprene	†4,927	0	4,927	3,811	457	5,768
Nitrile types	†1,092	0	1,092	919	115	2,949
Natural rubber and latex, and synthetic rubbers, total	48,417	75,364	123,781	99,601	1,182	133,294
Reclaimed rubber, total	30,171	94	30,265	30,260	1,237	33,960
GRAND TOTALS	78,588	75,458	154,046	129,861	2,419	167,254

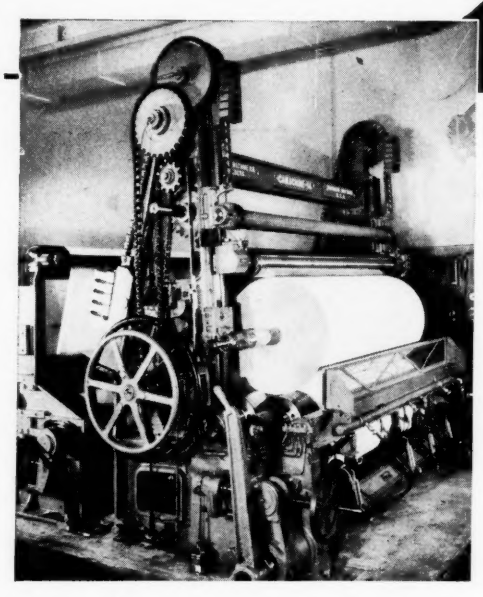
* Government plant production.
† Private plant production.
SOURCE: Industry Operations Bureau, NPA, United States Department of Commerce, Washington, D.C.

They emphasize *production!*



"WHEN WE WERE PLANNING construction of our revolutionary new coating machine at Johnson City, N. Y., we asked for record-breaking capacity, and *reserve capacity*. We achieved both. We're producing and converting top-quality sensitized papers faster than ever before, and we still have plenty of capacity in reserve to meet new demands in expanding markets."

JAMES FORRESTAL, General Manager
OZALID, Division of GA&F Corporation
Johnson City, New York



The Camachine 14 at Ozalid is equipped with pneumatic constant web tension unwind, electronic side register control and pneumatic slitter units. Speed rated at 1800 f. p. m. Maximum rewound roll diameter is 38".

OZALID's giant paper sensitizing machine, largest and fastest in the world, is capable of coating and drying 249,000 feet of 79" web per eight-hour day. The 79" web is converted to standard width rolls on a Camachine Type 14 Slitter-Rewinder. Single shift operation of the Camachine handles the complete output of the coating machine, despite overtime scheduling of the coating operation. Camachine has substantially increased the Ozalid production potential over roll converting equipment formerly used.

Its reputation for dependable, trouble-free performance at record-breaking speeds has made Camachine the *one* outstanding name in roll production equipment. No matter what material you produce or convert in roll form, Camachine engineers will be pleased to consult with you regarding faster production and improved roll quality.

Cameron Machine Company • 61 Poplar St. • Brooklyn 2, N.Y.

They can depend on Camachine®

AA-231

Fidelity

KNIT METHOD

OF HOSE REINFORCEMENT

offers you all these advantages...

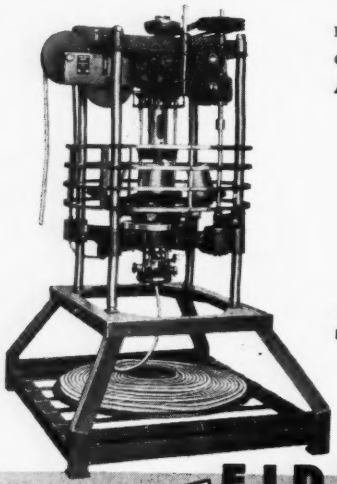
- Yarn package 16 times larger
- 1/3 floor space
- 300% faster production
- 500% greater labor efficiency
- 90% less down time
- Lower maintenance
- Complete automatic control
- 1/7 power required
- Minimum noise
- Lower capital investment

The Fidelity Knitter uses untreated rayon, cotton, nylon, fiberglass, etc. as purchased, eliminating costly treating and rewinding equipment. Only 4 yarns to tend, save time and give consistent hose diameters. No drying time after knitting.

Results—a finer, more flexible hose with better adhesion, at a lower cost than braided hose.

Only Fidelity Knitters can give you all these advantages . . . advantages that put you ahead of competition and provide your customers with a better hose.

Why not write for new bulletin on single or double deck models. ACT NOW!



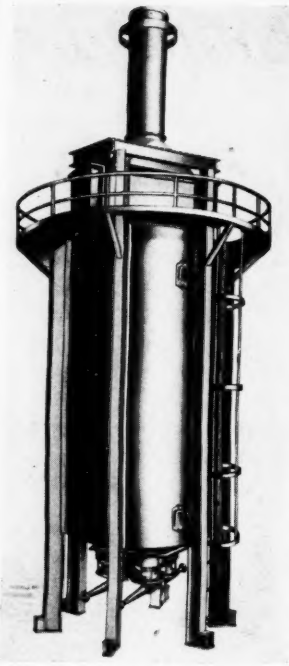
MODEL D-25
FIDELITY VERTICAL HOSE REINFORCEMENT MACHINE

Manufacturers of intricate precision machinery since 1911.

FIDELITY MACHINE COMPANY INC.

3908 FRANKFORD AVE. • PHILA. 24, PA., U.S.A.

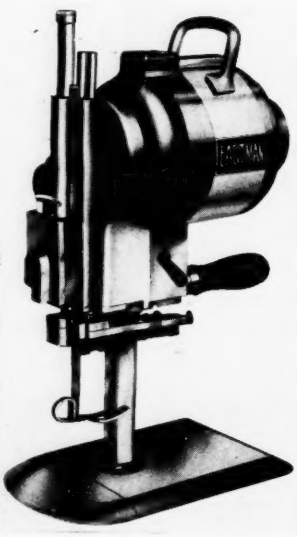
New Machines and Appliances



Direct Fired Process Heaters

A NEW standard line of direct fired heaters, with capacities from 100,000-15,000,000 BTU per hour, has been announced by Struthers Wells Corp., Warren, Pa. This equipment is designed for a wide range of applications, including indirect circulating heating using Dowtherm or other heat transfer mediums, and for direct heating of vapors and liquids.

Temperatures range to 750° F. and higher, and the heaters are designed for high thermal efficiency and trouble-free operation. Completely automatic control systems are available, and completely engineered systems with all necessary equipment can also be furnished. In addition to supplying heat at temperatures above those of existing steam supplies, the new units can also be used to supplement existing boiler capacity or for installation in remote locations in place of new steam facilities.



New Portable Cutter

A NEW Blue Streak cloth cutting machine with automatic belt sharpening of the straight knife, has been announced by Eastman Machine Co., Buffalo 3, N. Y. This machine is said to be three pounds lighter and 15% more powerful than the preceding model. The automatic sharpener is a separate unit which can be removed easily for cleaning. The abrasive belts are quickly replaceable and are available in different grits from extra-coarse to super-fine to provide the best cutting characteristics for the application involved. A wide range of knives with different types of cutting edges is available for use in cutting all types of plain and coated fabrics, foam rubber, and rubber and plastic film and sheeting.

The plate rollers of the machine's base plate are mounted in such a way that the entire machine weight is suspended in rubber to eliminate vibration, and the plate surface is lowered to reduce friction and distortion in the lay. Other features of the cutting machine include crossheads precision finished for frictionless operation; knife slides of hardened tool steel for extra strength and long wear; stationary turning knob for added safety; forged alloy steel standards to withstand the sharpest cutting curves; perfect balance; and simple operation. The new model is available in a wide range of sizes and motor powers.

THE STORY BEHIND THE WORD...

UTOPIA...

Sir Thomas More, in one of his famous political romances, gave the work a subtitle — "Utopia." The book described a place of perfect order and organization. The word itself was coined by More — from two Greek words, "ou" meaning "not" and "topos" meaning "place." For it was his true appraisal that Utopia exists no place.

A long record of strength, stability and progressive leadership has made the word Muehlstein—the First Name in Scrap Rubber and Scrap Plastic.

H. MUEHLSTEIN & CO. INC.

60 EAST 42nd STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: Akron · Chicago · Boston · Los Angeles · Memphis

WAREHOUSES: Akron · Chicago · Boston · Los Angeles · Jersey City

CRUDE RUBBER · SYNTHETIC RUBBER · SCRAP RUBBER · HARD RUBBER DUST · PLASTIC SCRAP

TESTED IS TRUSTED

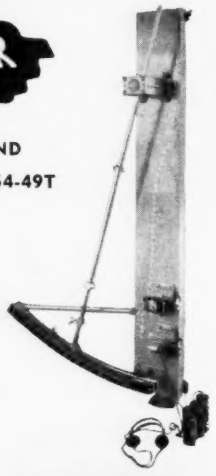
in switching from natural to synthetics

let these two testers guard you against costly errors, and guide you to quick arrival at the necessary changes in compounding.

REBOUND TESTER

GOODYEAR-HEALEY REBOUND TESTER FOR A.S.T.M. TEST 1054-49T

Liveliness is a factor that has to be watched and strengthened as you use more synthetic. This Scott Tester* evaluates the liveliness of elastomers, as well as the depth of impact required to product it.



BRITTLE POINT

Conforms to A. S. T. M. Designation D746

D11 for Rubber
D20 for Plastics

With a range of +50 to —80°C, this tester-which is self-contained and readily portable-can reproduce extremes of temperature under which rubber and plastics shatter like glass. A typical current use is in testing synthetic tubes of airplane tires for Arctic use.

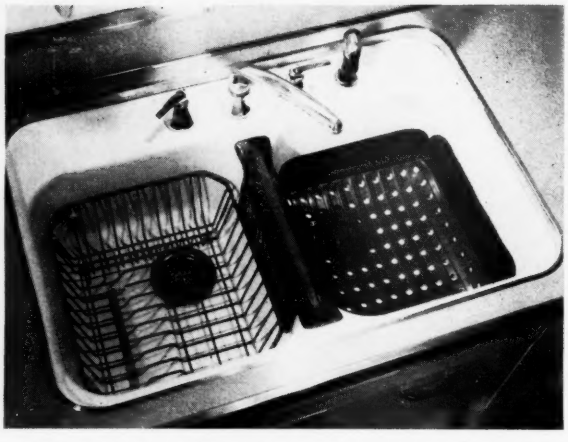
REQUEST CATALOG 50

SCOTT TESTERS, INC. 90 Blackstone St. Providence, R. I.

*Registered Trademark

Standard of the World

New Goods and Specialties



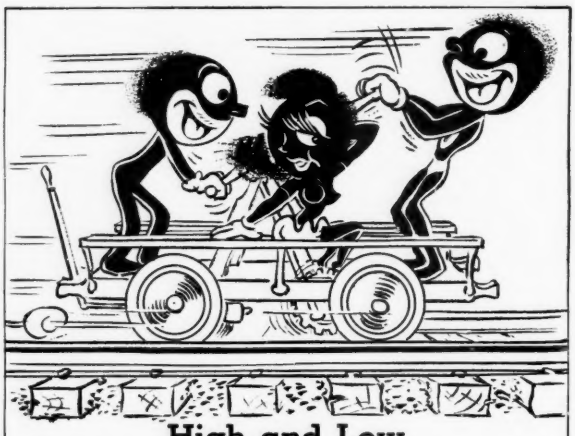
Rubbermaid Dishwashing Aids for Twin Sinks Include New Liner Mat *(Right)*, New Divider Mat *(Center)*, and Dish Drainer *(Left)*

New Sink Mats Aid Dishwashing

TWO new sink mats have been added to its line of Rubbermaid products for kitchen use by the Wooster Rubber Co., Wooster, O. The new products, the Rubbermaid Twin-Sink Divider Mat and the Rubbermaid Twin-Sink Liner Mat, were recently exhibited at the Chicago Housewares Show and will be advertised and promoted as durable, attractive dishwashing aids. Both mats are grease and acid resistant and are designed as practical and long-wearing buffers between dishes and glassware and the sides of the sink.

The divider mat is placed on the dividing wall between the sink bowls and has its sides extending well down each wall to reduce the breakage that frequently occurs when dishes are passed from one bowl to the other for draining or drying. This mat is 14 by 10½ inches in size and is available in colors of red, marbleized black, blue, yellow, and green.

The liner mat turns the sink bowl itself into a rubber lined dishpan, and protector flaps extending approximately three inches up each sink wall provide extra protection against breakage and jarring while dishes are being washed or rinsed. This mat is also available in the five colors of the divider mat.



High and Low

SEE PAGE 632

The more you use... the less it costs!

DOW CORNING CUTS PRICE OF SILICONE MOLD RELEASE AGENTS

More rubber companies . . . over 30% more than we supplied in 1949 . . . are making more consistent use of Dow Corning Silicone mold release agents. People in all kinds of industry are making more extensive use of our many other silicone products. We've doubled and tripled our productive capacity to keep pace with the demand.

That's why, for the eighth time in five inflationary years, we have been able to make another reduction in the price of our silicone mold lubricants.

That's a thank-you note dated January 15 and addressed to our customers.

To the entire rubber industry, such a rapidly increasing volume is proof of the usefulness of these materials. It's further evidence of the fact that our silicone mold release agents reduce scrap to an all time low . . . give quick, clean release of more accurate and highly finished parts from molds that stay cleaner longer.

Dow Corning Silicones Mean Business!

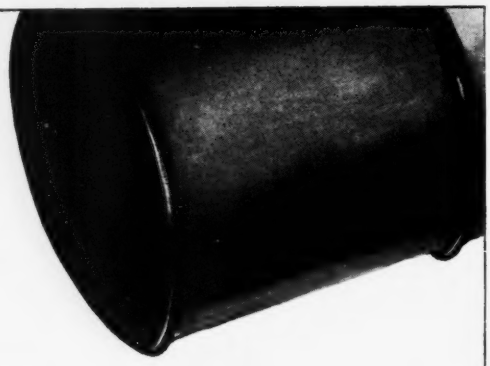
DOW CORNING CORPORATION

MIDLAND MICHIGAN

DOW CORNING SILICONES

ATLANTA • CHICAGO • CLEVELAND • DALLAS • LOS ANGELES • NEW YORK • WASHINGTON, D. C.

IN CANADA: FIBERGLAS CANADA LTD., TORONTO • GREAT BRITAIN: MIDLAND SILICONES LTD., LONDON



THESE CAN'T BE SUCCESSFULLY IMITATED!

You get better heat-light protection with Advance RESIN STABILIZERS. And experienced plastics men know they can't be successfully imitated!

Over twenty years of know-how, research and carefully controlled manufacture have time-tested and proven Advance VINYL RESIN STABILIZERS' superiority. Process risks are eliminated.

If you have a particular problem, call on us. We're always on hand.

Write for Literature

ADVANCE VINYL RESIN STABILIZERS			
#3	#52	#21	E6B
V-1-N	JCX	VL-3	BC-12
OTHERS PREPARED TO FIT YOUR NEEDS			

ADVANCE SOLVENTS & CHEMICAL CORP.
245 FIFTH AVENUE, NEW YORK 16, N.Y.

FAR EAST

MALAYA

New Export Duty Levied

The modified scheme for the new export duty on Malayan rubber was officially announced on December 4, 1950. Tax yield will be lower than would have been obtained under the system offered in November, but for the period January 1 to April 4, 1951, the original proposal that the duty should be 20¼ cents (Straits currency), including 16⅜ cents duty plus 3⅞ cents replanting cess, is retained, subject to revision if the price of rubber drops sharply.

Rates will be fixed weekly, based on the average daily price at Singapore during the preceding fortnight. Besides a cess has been imposed to constitute a replanting and new planting fund. Approved forward contracts entered before September 24 will be dutiable at the new rate, calculated on the price current at the time the contract was made.

The replanting cess is in addition to the already existing cess of ½ cent per pound collected for a rubber fund to finance research and propaganda. The proceeds of the new cess, to be made available for replanting and new planting, will be paid into a separate fund and held in trust until a satisfactory scheme has been worked out for making similar deductions when rubber is first sold and passing the credit for such deductions direct to individual producers. Then collection of the cess will be suspended.

The new duty applies when the average price exceeds 60 cents a pound and is to be worked out according to the formula: 1.55 of the price, less 63 cents, divided by 10. When the price does not exceed 60 cents, the present rate of 5% *ad valorem* applies. The replanting cess is calculated according to the formula: 0.45 of the price, less 27, divided by 10. The existing cess of ½ cent per pound referred to above remains unaltered, regardless of price and assessable duty. Calculations of the duty and new cess will be to the nearest ⅛-cent.

The working of the levy is shown in the table below:

Price	Duty	Replanting and New Planting Cess	Total of the Two (Excluding Malayan Rubber Fund Cess)
50	2½	Nil	2½
60	3	Nil	3
70	4½	½	5
80	6½	⅞	7
90	7½	1⅜	9
100	9¼	1¾	11
110	10¾	2¼	13
120	12¼	2¾	15
130	13⅞	3⅛	17
140	15⅜	3⅝	19
150	17	4	21
160	18½	4½	23
170	20	5	25
180	21⅝	5⅜	27
190	23⅛	5⅞	29
200	24¾	6¼	31

NOTE: Figures are in Straits cents per pound.

Rubber Industry Notes

The Secretariat of the Rubber Study Group has calculated the yields of high-yielding rubber in Malaya for the first nine months of 1950 as follows: on European estates, 848; Chinese, 783; Indian, 545; others, 616 pounds per tapped acre per annum. The figure for all high-grade rubber works out at the relatively high figure of 825 pounds per tapped acre per annum, reflecting the proportionately much larger area of improved rubber on European estates.

For ordinary rubber the respective yields are calculated as 456, 397, 381, and 306 pounds per tapped acre per annum.

In line with Malayan aims to standardize the quality of rubber, plans have been worked out for a central processing factory in Johore Bahru with capacity to handle 1,000,000 pounds of rubber a month, to be increased later to 2,000,000 pounds a month. It is intended to buy latex from smallholders and convert it into crepe, sheet, rubber powder, or liquid latex, according to demand. A site has already been selected, and building was scheduled to begin soon.

Trial strips of rubber-asphalt roads were laid in Kuala Lumpur and Singapore last year, and Penang was reportedly also interested in carrying out similar experiments. Rubber powder

Calco®

AMERICAN Cyanamid COMPANY

CALCO CHEMICAL DIVISION
INTERMEDIATE AND
RUBBER CHEMICALS DEPARTMENT
BOUND BROOK, NEW JERSEY

SEE REVERSE SIDE

for the purpose was to have been supplied by the British Rubber Development Board, and if the tests proved successful, the flood-damaged runway at the Bayan Lepas aerodrome was to get a rubberized surface also.

INDIA

The Indian Rubber Board has issued a special pamphlet, No. 4, devoted to the marketing and utilization of rubber latex in India. From this we learn that up to 1934 the Indian rubber industry relied on imports for supplies of preserved latex, but that after a small experimental lot of locally prepared latex was found to be just as satisfactory, the output of preserved latex here advanced steadily until it is about 2,240,000 pounds (dry weight) at present. As the manufacture of latex goods is essentially a cottage industry, it is pursued in more than 200 factories scattered over India. Both 50 and 58-60% latex are marketed in India. The 50% latex is obtained by diluting the more concentrated type with normal liquid latex, and many manufacturers seem to prefer it since it is claimed to have good stability, being superior to concentrated latex in this respect, and yet offering the advantages of the latter.

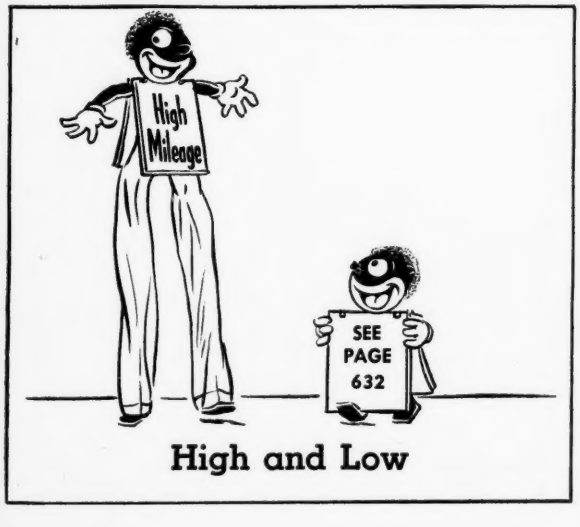
After a peak in 1947 in making latex goods was reached, a decline set in which analysis by an expert revealed was due largely to uncontrolled production of frequently inferior goods by inefficient and under-capitalized enterprises and unloading of factory stock at give-away prices. The poor quality lost manufacturers overseas markets, and the dumping flooded the local market with cheap, low-grade products. Many manufacturers were also handicapped by their inability to produce other than dipped goods. The decline in the latex industry here is probably no more than a necessary weeding-out process which should eventually benefit the trade as a whole.

The pamphlet lists a number of articles made in India partly or wholly of latex, including nipples, gloves, balloons (including meteorological balloons), inflatable toys, thread, Hairlok goods, hose, foam latex upholstery and toys, flooring, waterproofed cloth and garments. It is pointed out that high-grade toys produced in India are exported, also to England.

The Indian Rubber Board is keenly interested in the development of the latex trade here and offers assistance in preparation, marketing, and testing normal and concentrated latex.

CEYLON

Last September the Minister of State for Ceylon introduced discussions with the Ceylon Employers' Federation on the subject of the Ceylonization of estate staffs with the statement that the nation faced a grave problem of finding employment for its own nationals, many of whom were unemployed, and that the situation would be still further aggravated as and when the graduates from schools and colleges began to enter



High and Low

3 Ideal Reds for Natural or Synthetic RUBBER

MAPICO

COLUMBIAN COLORDS

RED 297
Strong Color on the Orange Side

RED 347
Darker Mass Tone—Blue Cast

RED 387
Still Darker Mass Tone—Bluer Cast

IRON OXIDES OF EXCEPTIONAL PURITY

For wide variety of uses, high quality and uniformity these clean, bright reds are stand-outs. New, highly modernized plant and equipment and precise production controls have made them better than ever. Note these desirable characteristics.

- Clean bright color and tint
- Easy dispersion and processing
- Color permanence
- Exceptional strength
- Unusual purity
- Fine particle size
- Good aging behavior
- Moderate reinforcement
- Spheroidal particle shape
- Tear and flex resistance

For better color and better products use these MAPICO REDS in:

- High quality innertubes
- Footwear
- Rubber hose
- Drug items
- Sundries and
- Chemical goods

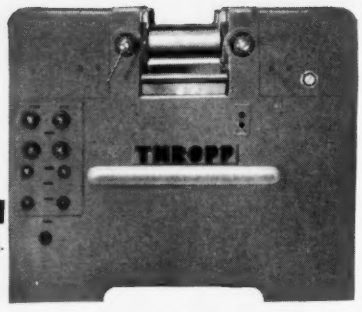
LOOK TO MAPICO FOR LEADERSHIP

COLUMBIAN CARBON COMPANY

Our technical staff is at your service

COLUMBIAN CARBON COMPANY
MAPICO COLOR DIVISION
MANUFACTURER
BINNEY & SMITH CO., Distributor
41 EAST 42nd ST., NEW YORK 17, N. Y.

NEW



6" x 12" with Anti-Friction Bearings

LABORATORY MILLS

Shown above is one of the new Thropp Laboratory Mills, a fine precision mill operating at high temperatures (650° F). A self-contained lubrication system circulates oil through the roll journal bearings. The use of piston ring type oil seals eliminates oil leaks and the frequent replacement of rubber-based oil seals. Capacity of mill: 2 to 3 pounds. Space required: 28" wide, 60" long. Write for specification folders of this and other laboratory mills.

WM. R. THROPP & SONS CO. Trenton, N. J.

CUSTOM BUILT FOR RUBBER & PLASTICS

By THROPP

RUBBER
CRUDE AND SYNTHETIC
Sole Distributors
DUNLOP CENTRIFUGED LATEX
NORTH · SOUTH · CENTRAL AMERICA

Sole U. S. Distributor of
SYNTHETIC LATICES
for
POLYMER CORPORATION, LTD.
Sarnia, Ontario, Canada

CHARLES T. WILSON CO., INC.
120 WALL STREET, NEW YORK 5, N. Y.
AKRON BOSTON LOS ANGELES TORONTO
MEXICAN SUBSIDIARY COMPANY:
COMERCIAL TROPICAL, S.A., MEXICO CITY

the labor market. He made various proposals; finally an agreement was reached recently which provides that no non-nationals are from now on to be engaged by estates as clerks, teachers, dispensers, members of the technical staff including rubber makers and their assistants, storekeepers, engine, truck, and car drivers, among other categories. Non-nationals presently employed in these capacities will be retired at 60 years of age unless they have become nationals of Ceylon. United Kingdom firms owning estates here will still be permitted to appoint non-Ceylonese managers and superintendents. Some uneasiness exists, however, among European firms on the possibility that non-Ceylonese may before long be barred from higher posts too.

Recently several rubber and tea estates owned by United Kingdom companies have been sold to local syndicates.

Many Ceylon planters would like to make some favorable international rubber agreemment now while the time seems opportune for them. At meetings held last December by influential planting associations representing a large proportion of rubber growers, discussion turned on this topic, and it was evident that such an arrangement would be welcomed, but opinions on the questions of price and the duration of an agreement differed widely.

INDONESIA

Some years before World War II, European and American capital began to be interested in the manufacture of rubber goods in Java, and several factories were established. Not much concerning these enterprises has been published since the war's end, but reports covering the first half of 1950 seem to indicate that some of the largest at least are operating. The leading tire manufacturing plant at Bogor, near Djakarta (formerly Batavia), employs 1,200 workers in three shifts and produces daily 350 truck tires, 425 passenger-car tires; 5,000 bicycle tires and tubes for all types of tires. The daily consumption of rubber is 15 tons. The largest rubber shoe factory made 710,000 pairs of rubber-soled shoes in the first half of 1950.

On the outskirts of Djakarta is a new tire factory which was producing 1,000 bicycle tires and tubes daily around the middle of last year when the plant was still incomplete. It was expected that when the factory was in full running order, sometime about the beginning of the current year, production of cycle tires and tubes would be quadrupled and that automobile and truck tires would also be made.

Only two of the factories in this territory are financed by Indonesians. But it is apparent that the government intends to change the situation. For one thing licenses for new latex factories are granted only to Indonesians. These plants require little capital and will provide the Indonesians with the chance to gain experience and accumulate funds needed to enter wider manufacturing fields. At the same time there is no intention on the part of the government to discourage large-scale foreign investment in rubber manufacturing.

In the first quarter of 1950, Indonesia exported various types of gutta to a total of 202 metric tons, of which the United States took 64 tons.

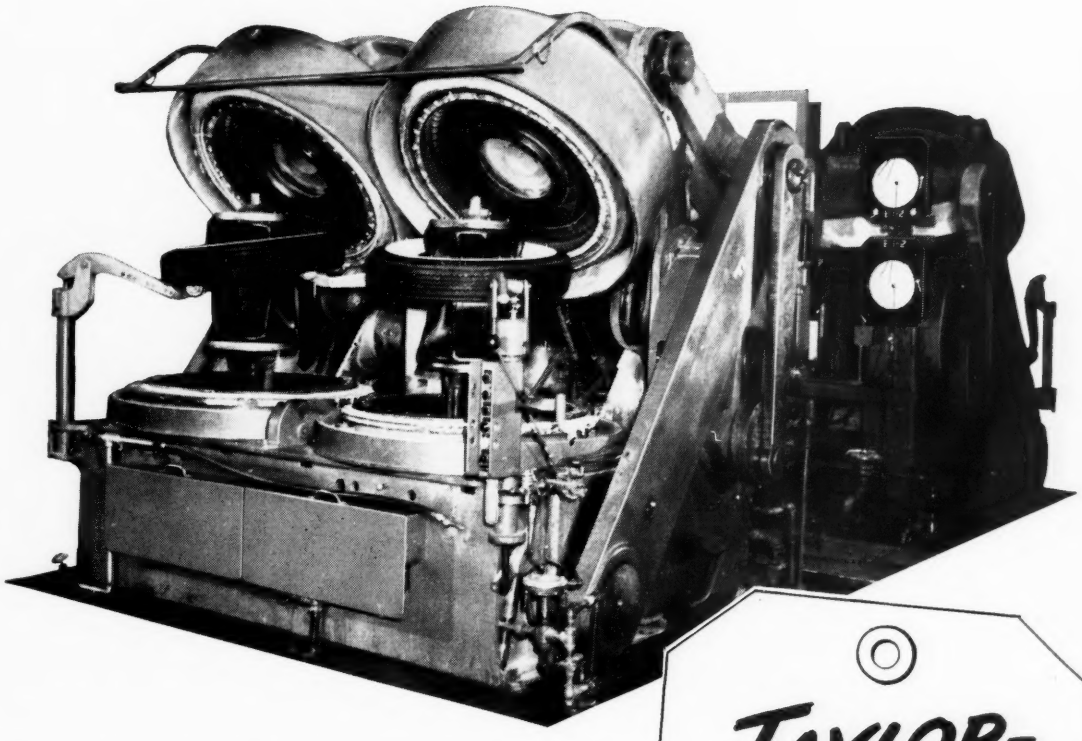
The general export duty on estate rubber from Indonesia has been raised to 47½ cents (local guilder currency) per half-kilogram for the first quarter of 1951. The duty has been increased progressively from 7.8 cents in the first quarter of 1950, 12.1 cents for the second quarter, 17.3 cents for the third, and 30.7 cents for the fourth quarter last year.

Tire Output in Chile and Brazil

Chile's output of automobile and heavy-duty tires increased slightly from 97,713 units in 1948 to 98,789 units in 1949, but production of tubes fell steeply from 91,335 to 56,571 units. At the same time imports of rubber goods reportedly included in 1949 automobile, truck, and bus tires valued at 5,036,405 gold pesos (pesos $0.20 U.S.); tubes, 519,065 pesos; and tractor tires, 776,442 pesos.

Brazilian production of tires in 1949 included 597,897 passenger-car and motor cycle tires, and 573,684 heavy-duty tires, making a total of 1,171,581 tires; output of tubes of all kinds came to 762,667 units.

New Bag-O-Matic Press *saves space and time*



THE NEW McNeil Bag-O-Matic Press combines these complicated operations into one simple process by: **(1)** automatically controlling time and temperature during curing **(2)** automatically "bagging" before vulcanizing and "debagging" after vulcanizing **(3)** and automatically opening the press. When delivered "Taylor-Equipped", as most of them are, they are masterminded by a Taylor FLEX-O-TIMER* Time Cycle Controller, two Taylor Double Duty FULSCOPE* Recording Controllers, and a Taylor Pressure Recorder.

FLEX-O-TIMER (*on back side*) automatically controls sequence and duration of all functions from closing to opening of press. Double Duty FULSCOPE Controllers (*right*) control press temperature and condensate removal in each cavity. Taylor Bi-Record Pressure Gage (*right, below*) records bag pressure to each press.

Whatever product you want to make, Taylor can control your process at low cost. To keep quality up and costs down, ask your Taylor Field Engineer! Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

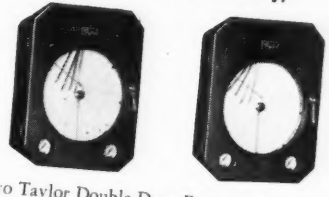
Taylor's Centennial ACCURACY FIRST SINCE 1851

*Registered Trade-Mark

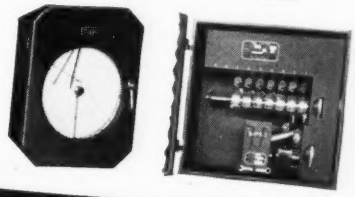
TAYLOR INSTRUMENTS MEAN ACCURACY FIRST

TAYLOR-EQUIPPED

(naturally)



Two Taylor Double Duty FULSCOPE Recording Controllers (*above*) and Taylor Bi-Record Pressure Gage and Flex-O-Timer Time Cycle Controller (*below*) standard-equipped on the new McNeil Bag-O-Matic Press.



For NEOPRENE COMPOUNDING

MAGLITE-M*

- Better acid acceptance
- Better anti-scorch properties
- Better uncured stock life
- Safer tubing at higher die termperatures
- Faster tubing and wire covering
- Better molding characteristics
- Excellent curing aid

MAGLITE-D*

Has all the advantages of MAGLITE-M with these added characteristics

- Greater bulking factor per cubic foot
- Higher magnesium oxide content
- Easier incorporation into neoprene
- Less dust

*Magnesium oxides produced by Marine Magnesium Corporation from sea water by patented processes.

Call on Whittaker
"The Talc House"

OTHER PRODUCTS FOR THE RUBBER INDUSTRY
PUMICE
ELK BRAND ANTIMONY OXIDE

WHITTAKER CLARK & DANIELS, INC.
260 West Broadway
New York 13, N. Y.

1189

GENERAL LATEX
and
CHEMICAL CORPORATION

Importers and Compounders
Natural and Synthetic
RUBBER LATEX

VULTEX
BUNA N
PLASTISOLS
RESIN EMULSIONS
LATEX COMPOUNDS

General Latex & Chemical Corp.
666 Main St., Cambridge 39, Mass.

General Latex & Chemicals (Canada) Ltd.
Verdun Industrial Bldg., Verdun, Montreal, Que.

Sales Representatives in Principal Cities
Exclusive Agents for sale in USA of
Harrisons & Crosfield Malayan Latex

Editor's Book Table

BOOK REVIEWS

"Natural and Synthetic High Polymers." Second Edition. Kurt H. Meyer. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. Cloth, 6 by 9 inches, 911 pages. Price, $15.

This new edition, Volume IV of the high polymers series, is completely revised and enlarged over the first edition that appeared in 1942. Some 216 pages have been added over the preceding edition, and each chapter has been revised and brought up to date to cover the rapid strides made in the field of polymer chemistry. The fundamental concept of the presentation remains the same: the analysis of the general principles and their theoretical foundations. As such, the presentation covers all aspects of polymer chemistry and will be of value as a text and reference to workers in the field, regardless of the diversity of their actual specific interests.

The subject matter is divided into 12 sections covering the following topics: introduction; physical and physico-chemical investigation of high polymers; inorganic high polymers; high polymeric hydrocarbons and their derivatives; polymeric ethers, esters, sulfides, etc.; cellulose and its derivatives; animal and vegetable polysaccharides and lignin; proteins; properties of high polymers in solution; elasticity, viscosity, and plasticity of high polymers; films, foils and membranes; and molecular structure of animal and plant tissues. The section on high polymeric hydrocarbons contains an extensive discussion of natural rubber, gutta percha, and synthetic rubbers. Many literature references are appended throughout all the discussions, and the book includes extensive author and subject indices.

"The AMA Handbook of Wage and Salary Administration. Tested Compensation Methods for Factory, Office and Managerial Personnel." Edited by M. Joseph Dooher and Vivienne Marquis. American Management Association, 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9 inches, 416 pages. Price, $7.50; AMA members, $5.

The AMA handbook is an integrated compilation of the best material on wage and salary administration that the Association has published, representing the work of leading authorities in the field. It contains, in addition, new AMA research material on wage surveys, union contract provisions covering office salary administration, and job evaluation forms, as well as an up-to-date bibliography.

Setting forth the basic principles and requirements that must be considered at every stage of planning and administration, the book is designed to meet the needs of companies that contemplate setting up a formal program of wage and salary administration for the first time as well as those who wish to review and improve their present programs in the light of tested and up-to-date techniques. Unlike most other volumes on the subject, the AMA Handbook provides a balanced treatment of all the major types of job evaluation plans, representing many different schools of thought, together with case accounts of their use and adaptations to meet special problems in large and small companies.

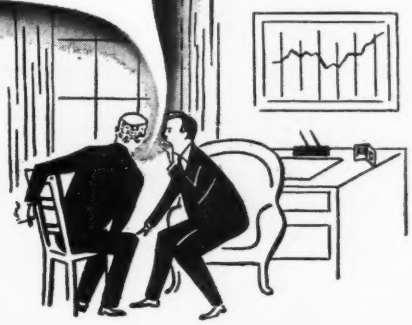
Besides a comprehensive discussion of the basic principles and approaches in wage and salary administration the 34 chapters cover such subjects as: techniques of wage survey; case histories in wage and salary administration; effective compenation methods for salaried jobs; supervisory and executive salary administration; joint labor-management job evaluation; methods for keeping wage programs up-to-date; selected forms for job evaluation; and results of recent research into simplified wage administration.

"The Chemical Formulary. Volume IX. 1951" H. Bennett, Editor-in-Chief. Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. Cloth, 5½ by 8¼ inches, 664 pages. Price, $7.

Continuing the format of preceding editions in the series, this new volume presents thousands of formulae and methods of compounding for the manufacture of a wide range of industrial and consumer products. In addition to presenting new formulae differing from those appearing in the previous volumes, this volume has a considerably enlarged list of chemicals and trade-name materials with their suppliers. Other reference material included in the book is a list of abbreviations used, data tables, references and acknowledgments, and a comprehensive index.

Formulae presented are grouped into the following product classifications: adhesives; cosmetics and drugs; ceramics, glass,

Confidentially, when you compare the actual insoluble sulphur content, you'll find that on a per unit basis CRYSTEX insoluble sulphur is your best buy!



CRYSTEX

• • • is guaranteed to contain not less than 85% Insoluble Sulphur. Write for a generous testing sample and a copy of the CRYSTEX Insoluble Sulphur Circular.

OTHER RUBBERMAKERS' CHEMICALS

- Commercial Rubbermakers' Sulphur, Tire Brand, 99½% Pure
- Refined Rubbermakers' Sulphur, Tube Brand
- "Conditioned" Rubbermakers' Sulphur
- Carbon Tetrachloride
- Carbon Bisulphide
- Caustic Soda
- Ethylene Trithiocarbonate
- Sulphur Chloride
- Flowers of Sulphur 99½% Pure (30% Insoluble Sulphur)

Stauffer CHEMICALS SINCE 1885

STAUFFER CHEMICAL COMPANY, 420 LEXINGTON AVENUE · NEW YORK 17, N. Y.

221 N. LaSalle St., Chicago 1, Ill. · 424 Ohio Bldg., Akron 8, Ohio

824 Wilshire Blvd., Los Angeles 14, Cal. · Houston 2, Texas

636 California St., San Francisco 8, Cal.

Porcelain Glove Forms

—for dipped rubber gloves, including linemen's or electricians' gloves and surgeons' gloves. Some are made from our own stock molds and others from customers' molds.

Write today for our new catalog covering rubber glove and other forms for dipped rubber goods. Prompt attention given to requests for quotations based on your specifications or stock items.

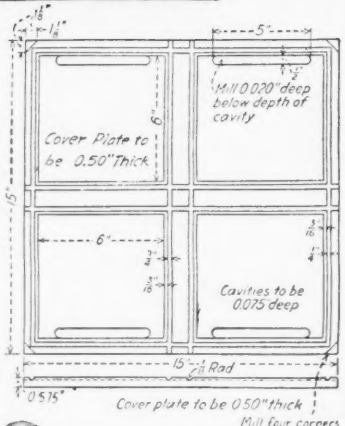
The Colonial Insulator Company
Since 1894

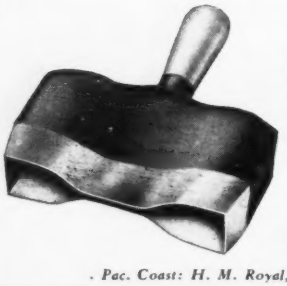
993 Grant St.
Akron 11, Ohio

Chicago Office:
2753 W. North St.

MOLDS AND DIES — HOGGSON BRAND Since 1849 — FOR RUBBER TESTING

Single and 4-cavity Molds for making test slabs in stock. Molds for Adhesion test pieces, Abrasion test, Compression samples and Flexing tests molds made to order.


Cover Plate to be 0.50" Thick
Mill 0.020" deep below depth of cavity
Cavities to be 0.075 deep
Cover plate to be 0.50" thick
Mill four corners ⅛ deep for prying mold apart



Standard ASTM and Federal dies for cutting test tensile and tear strength samples and dies for Slab curing carried in stock. Write for complete catalog.

HOGGSON & PETTIS MFG. CO.
1415 Brewery St.
NEW HAVEN 7, CONN.

Pac. Coast: H. M. Royal, Inc., Los Angeles

and cement; colloids; farm and garden products; food; ink and marking compounds; insecticides, fungicides, and weed killers; leather, skins, and furs; lubricants and oils; metals and their treatment; paint, varnish, lacquer, and other coatings; paper; photography; polishes; pyrotechnics and explosives; rubber, resins, plastics, and waxes; soaps and cleaners; textiles; and miscellaneous.

NEW PUBLICATIONS

"Insulation and Jacket Compounds for Wire and Cable." Report No. 50-7, November, 1950. C. E. McCormack and R. H. Baker, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 44 pages. This report suggests many compounds of neoprene, natural rubber, and GR-S for use as insulations and jackets in various types of wire and cable. Recommendations are made for compounds to meet ASTM and Underwriters' Laboratories specifications, and the physical properties of all compounds are tabulated with the specification requirements.

"Rubber in America before 1492." Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass. 12 pages. This is an informal historical account of ancient American rubber uses and applications written by J. Eric S. Thompson, noted archaeologist. Applications discussed include balls, rubber soled shoes, rubber ponchos, rubber bulbs for syringes, and rubber covered idols, and they are presented in a very interesting manner.

"The Chemistry of Acrylonitrile." American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. Cloth, 6 by 9 inches, 95 pages. This book gives detailed information on the different methods of synthesis of acrylonitrile; physical properties, including structure, stability, and handling precautions; chemical properties, including reaction chart, reactions of the nitrile group, reactions of the double-bond, cyanoethylation reactions, and polymerization reactions; applications, including adhesives, antioxidants, emulsifying agents, fibers, plastics, plasticizers, rubber, surface coatings, etc.; methods of analysis; and toxicity; A bibliography of 580 literature references is appended, together with a comprehensive subject index.

"Chemical Process and Plant Engineering." R. S. Aries & Associates, New York 17, N. Y. 6 pages. This folder describes the company's services in chemical process and plant engineering, including preliminary economic evaluation, process design, plant location and design, purchasing and expediting equipment, plant construction and initial plant operation.

"Research for Industry." Armour Research Foundation, Illinois Institute of Technology, Chicago 16, Ill. 55 pages. This is the 1950 annual report of the Foundation, and the booklet reviews accomplishments of the various divisions and the work being done in sponsored research. An organization chart is also included, together with a listing of the Foundation's administrative staff and board of trustees. Of particular interest is the note that a rubber research laboratory has been set up in the plastics section to conduct sponsored research.

Publications of Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago 11, Ill. **"Bi-Monthly Supplement to All Lists of Inspected Appliances, Equipment, Materials."** October, 1950, and December, 1950. 104 and 77 pages, respectively. **"List of Inspected Gas, Oil, and Miscellaneous Appliances."** November, 1950. 232 pages.

"Engineering Data on 'O' Ring Hydraulic Packings." Precision Rubber Products Corp., Dayton 7, O. 6 pages. This bulletin gives information on O-ring design and application factors, types of rubber compounds used and their properties, and tables of sizes and dimensions of O-rings available.

"Colloidal Graphite as a Parting Compound." Bulletin No. 427. Acheson Colloids Corp., Port Huron, Mich. 6 pages. This report discusses use of Dag colloidal graphite as a parting compound to prevent sticking, corrosion, galling, and freezing of metal parts. Included is a discussion of application in the rubber industry as a mold release lubricant in tire vulcanizing.

BIBLIOGRAPHY

New Methods of Studying and Controlling Yarns for Tire Fabric. M. Leblanc, *Rev. gén. caoutchouc*, 26, 7, 499 (1949).

Structure and Properties of Natural and Synthetic Rubber. A. Springer, *Kautschuk u. Gummi*, 2, 5, 147-150 (1949); 6, 182.

Vibration Damping with Rubber in Rubber Milling Machines. W. Hollstein, *Kautschuk u. Gummi*, 2, 6, 179 (1949).

Generators for High-Frequency Dielectric Heating. A. W. Pfefferl, *Kunststoffe* 39, 4, 86 (1949).

New Sulfonamide Resins. W. Scheele, M. Fredenhagen, T. Timm, *Kunststoffe*, 39, 5, 109 (1949).

Changes in the Use of Softeners in the Manufacture of Artificial Leather. K. Werner, *Kunststoffe*, 39, 6, 121 (1949).

Reaction of Bromine with Rubber in Aqueous Dispersion and Its Analytic Employment. F. J. Maffei, M. Outa, *Anais assoc. quim. Brasil*, Dec., 1948, 195.

Determination of Copper in Materials for the Rubber Industry. J. Genova, A. Addobbati, *Anais assoc. quim. Brasil*, Dec., 1948, 204.

Physical and Chemical Tests on Rubber in the Laboratory. J. Lemee, *Rev. gén. caoutchouc*, Sept., 1948, p. 343.

Control on Finished Goods. Pneumatic Tires. W. Demarche, *Rev. gén. caoutchouc*, Sept., 1948, p. 352. Mechanical Goods. H. Coinon, *Ibid.*, Oct., 1948, p. 390.

Synthetic and Natural Rubber—Control of the Raw Rubber. A. Jarrijon, *Rev. gén. caoutchouc*, Sept., 1948, p. 357.

Some Problems Raised in the Preparation of Compounds on an Industrial Scale. B. Morisson, *Rev. gén. caoutchouc*, Sept., 1948, p. 366.

Control of Rubber in the Course of Manufacture. R. Walter, *Rev. gén. caoutchouc*, Oct., 1948, p. 394.

The Rubber Industry and the Petroleum Industry. A. Graetz, M. Moulin, *Rev. gén. caoutchouc*, Oct., 1948, p. 403.

The Course of the Latex Vessels in the Leaf Base of *Hevea brasiliensis*. G. M. van Aggelen-Bot, *Arch. Rubbercult.*, July, 1948, p. 115.

Formation of Rubber in *Hevea brasiliensis*. I. de Haan, G. M. van Aggelen-Bot, *Arch. Rubbercult.*, July, 1948, p. 121.

Measurement of High Viscosities at Low Temperatures with the Vogel-Ossag-Ascending Tube. *Angew. Chem.*, 20, 8, 201 (1948).

Organic Polyvinyl Esters. W. Starck, *Kunststoffe*, 38, 10, 197 (1948).

Use of Polyvinyl Alcohols for Medicinal Purposes. F. Kainer, *Kunststoffe*, 38, 10, 203 (1948).

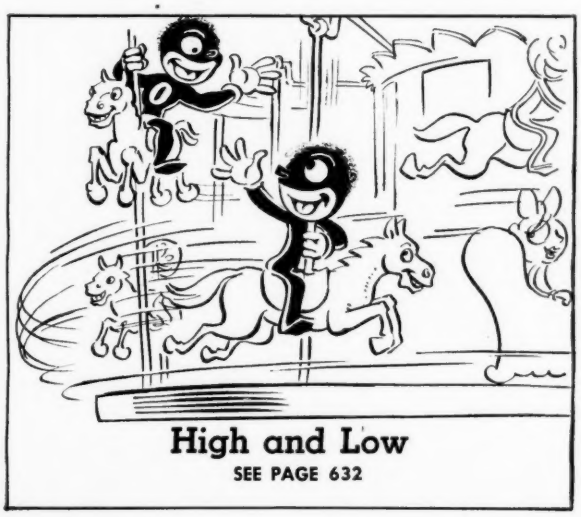
Contributions to the Development of Synthetic Rubber Compounds. G. E. Proske, *Kautschuk u. Gummi*, 1, 8, 209; 9, 245 (1948).

Statistical Theory of Macromolecular Solutions. J. H. van der Waals, *Makromol. Chem.*, 4, 105 (1949). **IV.** G. V. Schulz, *Ibid.*, 117.

Phase Relationships in Polymer Solutions. H. Tompa, *Trans. Faraday Soc.*, 45, 1142 (1949).

Use of Inequalities in Polymer Research. G. Herdan, *Research (London)*, 3, Suppl., 35 (1950).

Viscosity of High-Polymer Solutions. I-II. N. Saitô, *J. Phys. Soc. Japan*, 4, 85 (1949).



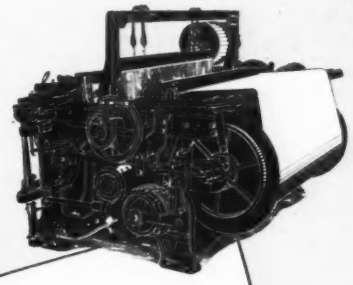
High and Low

SEE PAGE 632

TESTWORTH Laboratories Inc.

407 SOUTH DEARBORN TOL LAC CHICAGO 5

Distributors of Natural Rubber Latices • Manufacturer of Special Compounds of Synthetic or Natural Rubber Latices to Meet Your Needs



High quality cotton ducks and industrial fabrics—produced under rigid laboratory controls to meet the most exacting specifications.

CURRAN & BARRY

SELLING AGENTS

ESTABLISHED 1903

320 BROADWAY • NEW YORK 7, N. Y.

MARKET REVIEWS

CRUDE RUBBER

Commodity Exchange

WEEK-END CLOSING PRICES

Futures	Nov. 25	Dec. 30	Jan. 20	Jan. 27	Feb. 3	Feb. 10
Mar.....	52.40	61.50	66.00	67.00	67.00	72.00
May.....	47.50	55.50	61.00	63.00	63.00	67.60
July.....	43.00	53.00	56.00	58.00	58.00	62.00
Total weekly sales, tons	3,870	1,660	240	410	0	860

TRADING in rubber futures on the Commodity Exchange during the period from January 16 to February 15 consisted only of liquidations of open-interest contracts, in compliance with the GSA order that all open contracts be liquidated before March 31. From January 29 to February 5 all rubber trading was suspended by the Exchange to await further clarification of the price regulation order. This suspension was lifted on February 6 in order to permit traders to comply with the GSA liquidation order. It was established, however, that no trade can be made at more than 84¢ a pound, the highest price paid during the base period of December 19 through January 25.

The diminution of rubber futures trading on the Exchange was reflected by the total volume of 1,250 tons sold during January, as compared with the monthly average of 22,853 tons sold during 1950. During the first half of February only 870 tons were sold, and the total number of open contracts still to be liquidated were estimated at 141 lots (1,410 tons) at the end of trading on February 15.

March futures began the period at 66.00¢, reached a low of 64.00¢ on January 18, rose to a high of 74.25¢ on February 7, and closed at 72.25¢ on February 15. May and July futures prices showed corresponding movement and closed the period at 66.25¢ and 62.00¢ respectively.

New York Outside Market

WEEK-END CLOSING PRICES

Spot Prices	Nov. 25	Dec. 20	Jan. 20	Jan. 27	Feb. 3	Feb. 10
No. 1 R. S. S.	63.50	79.00	71.50	72.00	71.50	74.00
No. 3 R. S. S.	61.00	76.50	69.50	70.00	69.50	72.00
No. 2 Brown	56.50	72.00	60.50	61.00	60.50	63.00
Flat Bark	50.50	66.00	50.50	51.00	50.50	55.00

RUBBER trading was very light in the New York Outside Market during the period from January 16 to February 15. Market undertones were firm in view of continuing demand for rubber from Russia and the Continent, which maintained prices at high levels. These high prices served practically to eliminate any government stockpile buying on the domestic market. With the government withdrawn from the market, the only activity stemmed from scattered trade covering against commitment made prior to imposition of controls. These trade commitments are now said to be pretty much evened up, and the volume of dealer-to-dealer transactions has diminished very greatly.

The spot price for No. 1 sheets started the period at 71.50¢, closed the month of January at 72.00¢, reached a high of 74.00¢ on February 8, and remained at the high until the end of the period. Prices for other grades showed similar movement over the period, with No. 3 sheets going from 69.50¢ to 72.00¢; No. 2 Brown moving from 60.50¢ to 63.00¢, and Flat Bark rising from 50.00¢ to 55.00¢.

Latices

PROCEDURES have now been set up for purchasing *Hevea* latex from the government, according to Arthur Nolan, Latex & Rubber, Inc., writing in Lockwood's February *Natural Rubber News*. Buyers not covered by contracts registered with GSA can obtain latex in tank-car quantities by ordering either from his regular supplier or directly from the GSA, with first and second choices given as to latex quality and port of entry. GSA is requesting that buyers submit estimates of their requirements for 60 days forward. Buyers of latex in drums or tank trucks can place their orders with their regular supplier, and delivery will be made from stocks held for this purpose. In all cases buyers must certify that latex so ordered will be used in strict conformance with NPA regulations.

Early in February GSA announced that the price for tank-car quantities of concentrated *Hevea* latex is 84.5¢ a pound of total dry solids, f.o.b. point of shipment. This selling price reflects the government acquisition cost, plus costs of inspection, storage, maintenance, handling, distribution, etc. It is expected that this price will be periodically reviewed and adujsted in keeping with changes in costs. For quantities other than tank-car lots, prices are expected to include the following differentials over the tank-car price: tank truck, 1.5¢ a pound; carload in drums, 4¢ a pound; less than carload in drums, 4.5¢ a pound; 1-10 drums, 5¢ a pound; in 30-gallon drums, 6¢ a pound; and in less than 30-gallon drum quantities, 15¢ a pound.

Buyers of special latices may obtain their requirements from their regular suppliers by means of a GSA procedure whereby the buyer and the seller agree on quality, quantity, price, and delivery, and the GSA executes a "wash" transaction through its present controls. Here, also, a certificate of use in accordance with NPA regulations is required.

The proposal to convert plantation latex production to solid rubber production is not believed to be worthwhile, according to Mr. Nolan. A study has shown that such conversion of a major portion of latex production may require 8-12 months and the investment of heavy capital for sheet and crepe machinery. Even if successful, this conversion would probably supply not more than 2,000 tons of rubber a month, and this additional supply could be obtained immediately by a slight acceleration of present stockpile purchasing rates.

Allowable consumption of *Hevea* latex for the first quarter of this year, in addition to DO requirements, has been set at 17,000 tons, and it is doubtful if this total quantity will be actually used. While no official announcement has been made as yet, it is expected that not less than 4,000 tons a month, in addition to DO requirements, will be allowed for consumption during the second quarter.

While there appears to be no definite plan as yet for a latex committee to present the industry's views before the NPA, requests for such a committee have been made to NPA and are expected to be considered as soon as possible. The present M-2 method of controls over compounded latex has led to many administrative difficulties, confusion, probable duplication of records, etc. There is a possibility that the type of control used during 1942-1945 may again be adopted. In this policy, latex was considered "consumed" when first compounded.

Imports of *Hevea* latex during December are estimated at 3,954 long tons, dry weight; consumption, 4,987 long tons; and month-end stocks, 4,739 long tons. GR-S latex production during January is estimated at 3,276 long tons, dry weight, an increase of 894 long tons over the December figure.

SCRAP RUBBER

FIRM prices and moderate trading featured the scrap rubber market during the period from January 16 to February 15. Trading during the latter part of January was hampered by expectations of the price freeze which came at the end of the month. Following the freeze, demand for scrap by reclaimers was reported to be light as the trade awaited the establishment of price ceilings by the government. Inquiries for export were noted, but actual orders were said to be few and far between.

No changes occurred in scrap rubber prices during the period. Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$28.00	$31.00
Peelings, No. 1	60.00	60.00
3	35.00	35.00
	(¢ per Lb.)	
Black inner tubes	9.00	9.00
Red passenger tubes	13.00	13.00

RECLAIMED RUBBER

THE reclaimed rubber market showed little change during the period from January 16 to February 15 from the preceding month. Production of reclaim continued at a high level, with inner tube reclaims in short supply because of a shortage of tube scrap. Demand for reclaims increased to even higher levels in view of the restrictions on crude rubber consumption, and no changes in the overall reclaim picture appear to be in prospect for at least the next few months, if not longer.

CAN WITCO ASSIST WITH YOUR PROBLEMS?

our technicians are experts in:

the use of WITCO-made
- CARBON BLACKS
- METALLIC STEARATES
- WITCARB and WITCARB R
- PROCESSING AIDS
- M R (Hard Hydrocarbon)
- SUNOLITE (Anti-sunchecking wax)

So, to assist you in the many problems that today face the rubber compounder . . . shortage of natural rubber, increased prices of raw materials, availability of compounding ingredients . . . try

WITCO's TECHNICAL SERVICE

Whether it's conserving natural rubber, reformulating, or lowering costs, Witco's technical service staff is ready to put its experience to work for you. Write today.

WITCO CHEMICAL COMPANY

Continental Carbon Company

295 Madison Avenue • New York 17, N.Y.

Akron • Amarillo • Los Angeles • Boston • Chicago • Houston
Cleveland • San Francisco • London and Manchester, England

Final November and preliminary December statistics on the domestic reclaimed rubber industry are now available. November production totaled 30,171 long tons; imports, 94 long tons; consumption, 30,260 long tons; exports, 1,237 long tons; and month-end stocks, 33,960 long tons. Preliminary figures for December show a production of 32,005 long tons; consumption, 29,081 long tons; exports, 1,000 long tons; and month-end stocks, 34,359 long tons.

Reclaimed Rubber Prices

	Sp. Gr.	¢ per Lb.
Whole tire	1.18-1.20	10.00/10.75
Peel	1.18-1.20	nom.
Inner tube		
Black	1.20-1.22	nom.
Red	1.20-1.22	nom.
GR-S	1.18-1.20	nom.
Butyl	1.16-1.18	nom.

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	Nov. 25	Dec. 30	Jan. 20	Jan. 27
May	42.14	42.51	44.07	43.77
July	41.40	41.86	43.69	43.31
Oct.	36.35	39.18	41.12	41.36
Dec.	35.80	38.72	40.75	40.96
Mar.	35.70	38.46	40.63	40.86
May	35.45	38.25	40.43	40.67

COTTON futures trading on the New York Cotton Exchange began the period from January 16 to February 15 at a high level of activity. Firm demand by mills and short covering by traders contributed to an active market with rising prices. Prices began to fall off on January 25 in expectation of the price order, and trading was suspended by the Exchange on January 27 to await clarification of the order and the evolution of a method whereby commodity exchanges could operate under the government regulation. At the end of the period, no clarification or new trading system had been announced despite many rumors of impending new regulations, and the Exchange remained closed.

Under the price regulation, all sales of raw cotton except those made by the farmer are subject to price control; the ceiling price is the highest price at which a seller delivered raw cotton during the December 19 to January 25 base period. Under this order baled cotton which has been through the gin is considered raw cotton. The cotton industry wants no controls until the cotton comes from the mill as yarn or cloth; whereas OPS officials are said to want a ceiling price on raw baled cotton as it comes from the gin. A final decision is expected to be made by the President, but traders are doubtful that the Exchange could continue to operate in its normal hedging function under a cotton price ceiling.

Fabrics

Rising prices, high demand, and tight supplies featured the cotton fabrics market at the start of the January 16 to February 15 period. With the issuance of the general price regulation by the government, most mills withdrew completely from the market while they studied the order and attempted to set up selling policies. While some fabric constructions were price frozen at their correct levels, others were frozen at lower than market prices because they had been sold up several months in advance.

In addition to withdrawing from their regular business, producers of ducks were reported to be unable to meet invitations for bids received from the military services. Without knowing the future cost of raw materials, principally cotton, and unable to purchase cotton to cover future production, mills were unwilling to enter bids and took the position that clarification of the freeze order was essential before any future contracts could be undertaken.

Toward the end of the period some transactions for the third quarter were reported in several fabric constructions. These goods were sold only to regular customers on an allotment basis and covered only those constructions (print cloths, sheetings, twills, and drills) where mills were sufficiently covered on future cotton. Except for these sales, the only market activity during the first half of February consisted of second-hand sales, swapping, and sales of discontinued constructions.

Cotton Fabrics

Drills				
59-inch 1.85-yd.	yd.	$0.49	/	$0.501/2
2.25-yd.		.42	/	.427/8
Ducks				
38-inch 1.78-yd. S. F.	yd.	.487/8	/	.507/8
2.00-yd. D. F.	yd.	.445	/	.46
51.5-inch, 1.35-yd. S. F.		.645	/	.663/8
Hose and belting		.82		
Osnaburgs				
40-inch 2.11 yd.	yd.	nom.		
3.65-yd.	yd.	nom.		
Raincoat Fabrics				
Bombazine, 64x60 5.35-yd	yd.	nom.		
Print cloth, 381/2-inch, 64x60		.23	/	.2357
Sheeting, 48-inch, 4.17-yd.		.267/8	/	.273/8
52-inch 3.85 yd.		.291/8	/	.293/8
Chafer Fabrics				
14-oz./sq. yd. Pl.	lb.	.84	/	.865
11.65-oz./sq. yd. S.		.78		
10.80-oz./sq. yd. S.		.8175	/	.82
8.9-oz./sq. yd. S		.83	/	.845
Other Fabrics				
Headlining, 58-inch 1.35-yd., 2-ply	yd.	.62		
64-inch, 1.25-yd. 2-ply		.725	/	.75
Sateens, 53-inch 1.32-yd.		.71		
58-inch 1.21-yd.		.775	/	.791/8
Tire Cords				
K. P. st.l., 12-3-3	lb.	nom.		
12-4-2		.95		

RAYON

TOTAL domestic production of rayon during 1950 reached a new record high of 1,259,400 pounds, 27% above the 1949 figure and 12% higher than the previous record set in 1948. Of this production 310,000,000 pounds were of viscose high-tenacity yarn (7% above the 1949 level), 317,300,000 pounds were viscose and cupra textile yarn, and 326,600,000 pounds were acetate yarn. Fourth-quarter production of high-tenacity yarn totaled 83,300,000 pounds, an increase of 5,300,000 pounds over the preceding-quarter output. During 1950, production of 1100 denier high-tenacity yarn accounted for 17% of the total; while production of the 1650 denier and coarser yarns was 83% of the total. The average denier of high-tenacity yarn produced during 1950 was 1552, as compared with 1534 during 1949. Shipments of high-tenacity yarn by producers for use in tires and related products totaled 301,000,000 pounds during 1950, with an average denier of 1559, an increase of 7% over 1949 shipments.

On February 15 the NPA increased the number of DO rated orders high-tenacity rayon tire cord producers must accept from 10 to 15% of scheduled monthly production. The order amending Order M-13 was made to meet increased defense requirements in view of the fact that most producers had already accepted more than the 10% figure.

On February 6, Industrial Rayon Corp. announced plans either to build a new plant or expand its present facilities for rayon tire cord production to meet the growing demand. This expansion will be started as soon as assurance is received that the critical materials needed will be officially assigned to the project. The company reported that the capacity of its Painesville, O., plant was increased by more than 6,000,000 pounds during the past year, and an additional 6,500,000 pounds of tire cord capacity will be added to its Cleveland, O., plant this April. This latter addition will bring the company's total productive capacity to approximately 100,000,000 pounds a year.

Rayon Prices

Tire Yarns			
1100/ 480		$0.62/$0.63	
1100/ 490		.62	
1150/ 490		.62	
1650/ 720		.61/	.62
1650/ 980		.61	
1900/ 980		.61	
2200/ 960		.61	
2200/ 980		.60	
4400/2934		.63	
Tire Fabrics			
1100/490/2		.72	
1650/980/2		.695/.73	
2200/980/2		.685	

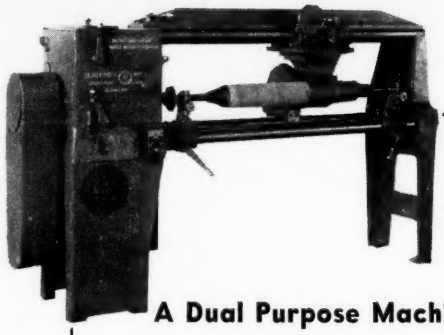
Electroplating Plastics

(*Continued from page 697*)

conductivity. The prepared part can then be given the regular metal plating of the thickness desired. When a single surface is to be plated, it is advisable to keep the thickness of final plate to less than 0.0005-inch in order to eliminate peeling, but heavier coatings of several thousandths of an inch may be used if the plating envelopes the entire surface of the piece. Highly polished surfaces are obtained by tumbling the plated pieces with commercial compounds.

New officers of the Section for 1951 are: president, Paul W. Felt, Brown & Bigelow; vice president, J. H. Kugler, Minnesota Mining & Mfg. Co.; and secretary-treasurer, W. Mahle, Northwest Plastics, Inc. Mr. Felt, D. R. Williams, Chippewa Plastics, Inc., and D. H. Chambers, Minneapolis-Honeywell Regulator Co., were elected directors of the group, and J. L. Formo, Minneapolis-Honeywell, was appointed national councilor.

Mr. Felt announced the appointment of the following committee chairmen: finance, Mr. Mahle; membership, A. G. Morrison; credentials, Fulton Holtby, University of Minnesota; professional activities, Mr. Williams; program, Mr. Formo; house, A. G. Bezat; publicity, Mr. Chambers; education, L. Erickson, Rainbow Plastics Products, Inc.; and bulletin editor, Mr. Chambers.



A Dual Purpose Machine For Grinding and Polishing

FINE BR TOOLS

RUBBER ROLLER AND TUBE GRINDING & POLISHING MACHINE (4-LM)

Wide and flexible range of speeds and feeds insure profitable production grinding and polishing of tubes and medium size rollers.

BLACK ROCK MFG. CO.

175 Osborne Street Bridgeport 5, Conn.

Pacific Coast Representative:

Lombard Smith Co. Los Angeles, Cal.

CROWN CLAY

SOUTHEASTERN CLAY CO.

AIKEN, SOUTH CAROLINA

Sales Agents

HERRON BROS. & MEYER ..... Akron
HERRON BROS. & MEYER ..... New York
C. M. BALDWIN ..... Chicago
ERNEST JACOBY & CO. ..... Boston
The C. P. HALL CO. of Calif. ..... Los Angeles
DELACOUR-GORRIE LIMITED ..... Toronto

EXCLUSIVE AGENTS

RCMA
RAY-BRAND
Centrifuged Latex

REVERTEX
72-75% Latex Concentrate

- Normal Latex
- GR-S Latex Concentrate
- Natural and Synthetic Latex Compounds

We maintain a fully equipped laboratory and free consulting service.

LATEX DIVISION

RUBBER CORPORATION OF AMERICA

274 Ten Eyck Street, Brooklyn 6, N. Y.
111 West Monroe Street, Chicago 3, Ill.

SALES REPRESENTATIVES: Charles Larkin II, 250 Delaware Ave., Buffalo 2, N.Y.; H. L. Blachford Ltd., 977 Aqueduct St., Montreal 3, Canada; Ernesto Del Valle, Tolsa 64, Mexico D.F.

The term

"COTTON FLOCKS"

does not mean cotton fiber alone

EXPERIENCE
over twenty years catering to rubber manufacturers

CAPACITY
for large production and quick delivery

CONFIDENCE
of the entire rubber industry

KNOWLEDGE
of the industry's needs

QUALITY
acknowledged superior by all users are important and valuable considerations to the consumer.

Write to the country's leading makers for samples and prices.

CLAREMONT WASTE MFG. CO.

CLAREMONT N. H.

The Country's Leading Makers

COMPOUNDING INGREDIENTS*

Abrasives

Pumicestone, powdered	lb.	$0.025	/ $0.055
Rottenstone, domestic	ton	36.00	/ 43.00

Accelerators, Organic

A-10	lb.	.40	/ .47
A-19	lb.	.52	/ .58
A-32	lb.	.59	/ .69
A-77	lb.	.42	/ .55
A-100	lb.	.42	/ .55
Accelerator 8	lb.	.98	
49	lb.	.48	/ .49
89	lb.	1.20	
122	lb.	1.30	
552	lb.	2.00	
808	lb.	.59	/ .61
833	lb.	1.13	/ 1.15
Aero AC 50	lb.	.50	/ .56
165	lb.	.37	/ .39
Altax	lb.	.38	/ .40
Rodform	lb.	.385	/ .405
Arazate	lb.	2.16	
Beutene	lb.	.59	/ .64
B-J-F	lb.	.27	/ .32
Butasan	lb.	1.00	
Butazate	lb.	1.00	
Butyl Eight	lb.	1.00	/ 1.05
Zimate	lb.	1.00	
Captax	lb.	.30	/ .32
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Cuprax	lb.	.60	/ .62
Diesterex N	lb.	.50	/ .57
DOTG (diorthotolyguanidine)	lb.	.52	/ .53
DPG (diphenylguanidine)	lb.	.42	/ .45
El-Sixty	lb.	.61	/ .68
Ethasan	lb.	1.00	
Ethazate	lb.	1.00	
Ethex	lb.	1.00	
Ethyl Thiurad	lb.	1.00	
Tuads	lb.	1.00	
Tuex	lb.	1.00	
Zimate	lb.	1.00	
Ethylac	lb.	.88	/ .90
Good-rite Erie	lb.	.32	/ .34
Hepteen	lb.	.42	/ .48
Base	lb.	1.80	/ 1.90
Ledate	lb.	1.00	
M-B-T	lb.	.34	/ .39
-XXX	lb.	.46	/ .48
M-B-T-S	lb.	.42	/ .47
Pellets	lb.	.425	/ .445
Mertax	lb.	.44	/ .51
Methesan	lb.	1.00	
Methazate	lb.	1.00	
Methyl Selenac	lb.	1.60	
Tuads	lb.	1.10	
Zimate	lb.	1.00	
Monex	lb.	1.10	
Mono-Thiurad	lb.	1.10	
Morfex	lb.	.59	/ .64
O-X-A-F	lb.	.43	/ .48
Pentex	lb.	1.00	
Flour	lb.	.20	
Phenex	lb.	.40	/ .45
Pipazate	lb.	1.53	
Rodform products	lb.	1.00	/ 3.00
Rotax	lb.	.42	/ .44
S. A. 52	lb.	1.10	
57, 62, 67, 77	lb.	1.00	
66	lb.	1.45	
Safex	lb.	1.15	
Santocure	lb.	.64	/ .71
Selazate	lb.	1.45	
Selenac	lb.	1.45	
SPDX-GH	lb.	.64	/ .69
Tellurac	lb.	1.45	
Tepidone	lb.	.55	
Tetrone A	lb.	1.85	
Thalam	lb.	.75	
Thiofide	lb.	.42	/ .49
Pellets	lb.	.36	/ .43
Thionex	lb.	1.10	
Thiotax	lb.	.34	/ .41
Thiurad	lb.	1.10	
Thiuram E	lb.	1.00	
M	lb.	1.10	
Trimene	lb.	.54	/ .64
Base	lb.	1.03	/ 1.18
Tuex	lb.	1.10	
2-MT	lb.	.75	
Ultex	lb.	1.00	/ 1.10
Ureka Base	lb.	.63	/ .70
C	lb.	.68	/ .75
Vulcanex	lb.	.45	
Z-B-X	lb.	2.45	
Zenite	lb.	.42	/ .44
A	lb.	.50	/ .52
Special	lb.	.43	/ .45
Zetax	lb.	.38	/ .41

Accelerator-Activators, Inorganic

Lime hydrated	ton	8.50	/ 14.00
Litharge, comml.	lb.	.1875	/ .206
Eagle, sublimed	lb.	.1975	/ .1985
National Lead	lb.	.205	/ .206
Red Lead, comml.	lb.	.1975	/ .22
Eagle	lb.	.2075	
National Lead	lb.	.215	
White lead, basic	lb.	.185	/ .195
Eagle, National Lead	lb.	.185	/ .195
White lead, silicate	lb.	$0.1625	/ $0.2225
Eagle	lb.	.2025	/ .2225
National Lead	lb.	.1625	/ .1725
Zinc oxide, comml.†	lb.	.16	/ .1925

Accelerator-Activators, Organic

Aktone A, B	lb.	.22	/ .23
Barak	lb.	.60	
Curade	lb.	.57	/ .59
D-B-A	lb.	1.95	
Delac P	lb.	.45	/ .52
Emersol 110	lb.	.2575	/ .27
120	lb.	.2625	/ .275
130	lb.	.285	/ .2975
210 Elaine	lb.	.2625	/ .29
Emery 600	lb.	.205	/ .2325
Guantal	lb.	.51	/ .58
Hyfac 430	lb.	.22	/ .2325
431	lb.	.23	/ .2425
Laurex	lb.	.29	/ .32
Lead oleate	lb.	.24	
MODX	lb.	.295	/ .345
NA-22	lb.	1.50	
Palmalene	lb.	.35	
Plastone	lb.	.27	/ .30
Polyac	lb.	1.60	
Ridacto	lb.	.25	/ .26
Seedine	lb.	.1485	/ .1705
SOAC-KL	lb.	.08	/ .11
Stearex Beads	lb.	.14⅞	/ .15⅞
Stearic acid, single pressed	lb.	.2575	/ .27
Double pressed	lb.	.2625	/ .275
Triple pressed	lb.	.285	/ .2975
Stearite	lb.	.095	/ .10
Tonox	lb.	.50	/ .59
Zinc stearate	lb.	.46	/ .48

Alkalies

Caustic soda, flake	100 lbs.	3.75	/ 6.77
Liquid, 50%	100 lbs.	2.55	/ 2.75
Solid	100 lbs.	3.35	/ 5.05

Antioxidants

AgeRite Gel	lb.	.60	/ .62
H.P.	lb.	.67	/ .69
Hipar	lb.	91	/ .93
Powder	lb.	.49	/ .51
Resin	lb.	.65	/ .67
D	lb.	.49	/ .51
Stalite	lb.	.49	/ .51
White	lb.	1.40	/ 1.50
D	lb.	1.45	/ 1.55
Akroflex C, F	lb.	.67	/ .69
Albasan	lb.	.69	/ .73
Aminox	lb.	.49	/ .58
Antioxidant 2246	lb.	1.60	/ 1.63
Antisol	lb.	.23	/ .24
Antox	lb.	.49	/ .51
Aranox	lb.	3.25	
Betanox Special	lb.	.70	/ .79
B-L-E, -25	lb.	.49	/ .58
B-X-A	lb.	.43	/ .52
Copper Inhibiter X-872-L	lb.	1.95	
Flectol H	lb.	.49	/ .56
Flexamine	lb.	.67	/ .76
Heliozone	lb.	.25	/ .26
Ionol	lb.	.95	/ 1.40
NBC	lb.	1.50	
Neozone A	lb.	.51	/ .53
C	lb.	.67	
D	lb.	.45	/ .51
Parazone	lb.	.75	
Perflectol	lb.	.61	/ .68
Permalux	lb.	1.85	
Rio Resin	lb.	.52	/ .54
Santoflex 35	lb.	.67	/ .74
AW	lb.	.66	/ .73
B	lb.	.49	/ .56
BX	lb.	.60	/ .67
Santovar A	lb.	1.40	/ 1.47
O	lb.	1.20	/ 1.27
Santowhite Crystals	lb.	1.55	/ 1.62
L	lb.	.49	/ .56
MK	lb.	1.25	/ 1.32
S.C.R.	lb.	.32	/ .34
Sharples Wax	lb.	.23	/ .28
Stabilite	lb.	.49	/ .51
Alba	lb.	.72	/ .77
L	lb.	.60	/ .62
White	lb.	.49	/ .56
Powder	lb.	.39	/ .43
Sunolite	lb.	.20	
Sunproof	lb.	.25	/ .30
Improved	lb.	.23	/ .28
Jr.	lb.	.18	/ .23
Thermoflex A	lb.	.98	/ 1.00
Tonox	lb.	.50	/ .59
Tysonite	lb.	.215	/ .2225
V-G-B	lb.	.65	/ .74
Wing-Stay S	lb.	.48	/ .58
Zenite	lb.	.33	/ .35

Antiseptics

Copper naphthenate, 6-8%	lb.	.2575	
Pentachlorophenol	lb.	.20	/ .28

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed; contact suppliers for spot prices.

†For trade names, see Color—White, Zinc Oxide.

Resorcinol, technical	lb.	$0.81	/ $0.85
Zinc naphthenate, 8-10%	lb.	.24	/ .2925

Blowing Agents

Ammonium, bicarbonate	lb.	.055	/ .06
Carbonate	lb.	.23	/ .24
Sodium bicarbonate	100 lbs.	2.10	/ 3.15
Carbonate, technical	100 lbs.	1.20	/ 4.62
Unicel	lb.	.82	
ND	lb.	1.40	
S	lb.	.20	

Bonding Agents

BAC Latex	lb.	.75	/ .80
MDI-50	lb.	2.75	/ 3.25
Ty-Ply Q, S	gal.	6.75	/ 8.00

Brake Lining Saturants

B.R.T. No. 3	lb.	.024	/ .025
Resinex L-S	lb.	.0225	/ .03

Carbon Blacks

Conductive Channel—CC

Continental R-20, -40	lb.	.15	/ .22
Kosmos/Dixie BB	lb.	.18	/ .215
Spheron C	lb.	.12	/ .165
N	lb.	.22	/ .25
Voltex	lb.	.18	/ .315

Easy Processing Channel—EPC

Continental AA	lb.	.069	/ .1175
Kosmobile 77/Dixiedensed 77	lb.	.069	/ .1125
Micronex W-6	lb.	.07	/ .1225
Spheron #9	lb.	.069	/ .117
Texas E	lb.	.065	/ .1075
Witco #12	lb.	.069	/ .1175
Wyex	lb.	.074	/ .12

Hard Processing Channel—HPC

Continental F	lb.	.069	/ .1175
HX	lb.	.074	/ .12
Kosmobile S/Dixiedensed S	lb.	.069	/ .1175
Micronex Mk. II	lb.	.07	/ .1225
Spheron #4	lb.	.069	/ .117
Witco #6	lb.	.069	/ .1175

Medium Processing Channel—MPC

Arrow TX	lb.	.074	/ .12
Continental A	lb.	.069	/ .1175
Kosmobile S-66/Dixiedensed S-66	lb.	.069	/ .1175
Micronex Standard	lb.	.07	/ .1225
Spheron #6	lb.	.069	/ .117
Texas M	lb.	.065	/ .1075
Witco #1	lb.	.069	/ .1175

Conductive Furnace—CF

Statex A	lb.	.08	/ .10

Fast Extruding Furnace—FEF

Statex M	lb.	.0575	/ .16

Fine Furnace—FF

Statex B	lb.	.0625	/ .105
Sterling 99	lb.	.065	/ .105
105	lb.	.12	/ .16

High Abrasion Furnace—HAF

Aromex	lb.	.079	/ .125
Philblack O	lb.	.08	/ .124
Statex R	lb.	.075	/ .125
Vulcan #1, #3	lb.	.074	/ .117

Medium Abrasion Furnace—MAF

Philblack A	lb.	.0625	/ .105

High Modulus Furnace—HMF

Continex HMF	lb.	.05	/ .09
Kosmos 40/Dixie 40	lb.	.05	/ .09
50/Dixie 50	lb.	.055	/ .095
Modulex	lb.	.055	/ .095
Statex 93	lb.	.0525	/ .095
Sterling L	lb.	.05	/ .09
SO	lb.	.055	/ .095

Reinforcing Furnace—RF

Kosmos 60/Dixie 60	lb.	.074	/ .1125

Semi-Reinforcing Furnace—SRF

Continex SRF	lb.	.035	/ .075
Essex	lb.	.04	/ .08
Furnex	lb.	.0375	/ .08
Gastex	lb.	.035	/ .075
Kosmos 20/Dixie 20	lb.	.035	/ .075
Pelletex	lb.	.035	/ .075
Sterling NS, R, S	lb.	.035	/ .075

Very Fine Furnace—VFF

Statex K	lb.	.075	/ .125

Fine Thermal—FT

P-33	lb.	.05	

Medium Thermal—MT

Thermax	lb.	.0325	
Stainless	lb.	.04	

Chemical Stabilizers

Dutch Boy DS-207	lb.	.57	/ .59
Dyphos	lb.	.5875	/ .6075

ORIGINAL PRODUCERS OF MAGNESIUM SALTS FROM SEA WATER

Magnesium salts from the sea

REGULAR AND SPECIAL GRADES OF
MAGNESIUM
CARBONATES
OXIDES
FOR THE RUBBER INDUSTRY

MARINE MAGNESIUM PRODUCTS CORPORATION

Main Office, Plant and Laboratories
SOUTH SAN FRANCISCO, CALIFORNIA
Distributors:

WHITTAKER, CLARK & DANIELS, INC.
260 West Broadway, New York
CHICAGO: Harry Holland & Son, Inc.
CLEVELAND: Palmer Supplies Co.
TORONTO: Richardson Agencies, Ltd.

G. S. ROBINS & CO.
126 Chouteau Avenue, St. Louis
THE C. P. HALL CO.
Akron, Chicago, Los Angeles

Write for Brochure

CABOT PINE PRODUCTS

PINE TAR
LIGHT
MEDIUM
HEAVY
PINE TAR OIL
PINE OIL
DIPENTENE

Quality Control
Dependable Supply
Technical Service

Cabot Pine Products are thoroughly analyzed and tested by the Cabot Laboratories for uniform, high quality performance in rubber. Staffed by trained technicians, the fully equipped Cabot Laboratories offer you complete technical service.

CABOT

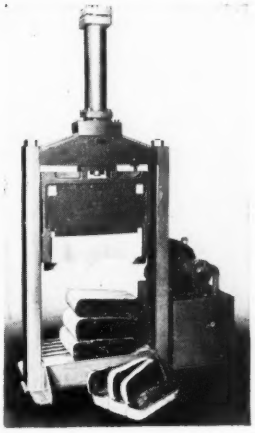
GODFREY L. CABOT, Inc.
77 FRANKLIN STREET
BOSTON 10, MASSACHUSETTS

LITTLEJOHN & CO., Inc.
120 WALL STREET
NEW YORK 5, N. Y.

CRUDE & SYNTHETIC RUBBER
NATURAL & SYNTHETIC LATEX

Balata, Gutta Percha
Pontianak—Gutta Siak
All Grades of
Brazilian & Far Eastern
Chewing Gum Raw Materials

CRUDE RUBBER BALE CUTTER



Complete Unit

Fully Assembled

Hydraulic Operation

High Production

An efficient machine of simple design for cutting bales of crude, synthetic and reclaimed rubber or similar materials. Cuts without aid of water or other lubricant. One man operation—safety control.

SPADONE MACHINE COMPANY, INC.
10 EAST 43RD ST. NEW YORK 17, N. Y.

Dutch Boy Dythal	lb.	$0.415	/ $0.435
Normasal	lb.	.4675	/ .4875
Plumb-O-Sil A	lb.	.2925	/ .3125
B	lb.	.3075	/ .3275
C	lb.	.3325	/ .3525
Tribase	lb.	.265	/ .285
E	lb.	.2325	/ .2525
Vanstay 16, 25	lb.	.33	/ .35
H	lb.	.75	/ .77
Witco Lead Stearate #50	lb.	.5025	
Stabilizer #70	lb.	1.25	

Colors

Black

Black Paste #25	lb.	.22	/ .40
BK Iron Oxides	lb.	.11	/ .1125
Covinylblaks	lb.	.62	/ 1.14
Lampblack, comml.	lb.	.077	/ .33
Superjet	lb.	.075	/ .11
Mapico	lb.	.1175	/ .12
MB Mineral Blacks	lb.	.0315	/ .0675

Blue

Du Pont	lb.	1.77	/ 4.55
Heveatex pastes	lb.	.80	/ 1.45
Stan-tone	lb.	1.00	/ 1.35
Toners	lb.	.30	/ 3.50

Brown

Brown Paste #5, #10	lb.	.35	/ .45
Mapico	lb.	.1275	/ .13
Tan	lb.	.1975	/ .20
Metallic brown	lb.	.0315	/ .044
Plastics brown	lb.	.0625	/ .07
Sienna, burnt	lb.	.0425	/ .155
Raw	lb.	.045	/ .1325
Umber, burnt	lb.	.0525	/ .075
Raw	lb.	.0425	/ .065

Green

Chrome	lb.	.125	/ .4775
Oxide	lb.	.375	/ 1.05
Du Pont	lb.	1.50	/ 3.20
G-4099, -6099	lb.	.34	/ .345
G-7599	lb.	.405	/ .41
GH-9869	lb.	.85	/ 1.00
9976	lb.	.95	/ 1.10
Heveatex pastes	lb.	.95	/ 1.85
Stan-Tone	lb.	1.50	/ 3.30
Toners	lb.	.35	/ 4.00

Orange

Du Pont	lb.	2.75	
Orange Paste #13	lb.	1.35	/ 1.50
Stan-Tone	lb.	1.65	/ 2.25
Toners	lb.	.30	/ 1.50

Red

Antimony trisulfide	lb.	.55	/ .68
R. M. P. No. 3	lb.	.55	/ .60
R. M. P. Sulfur Free	lb.	.63	/ .68
Cadmium red lithopone	lb.	1.70	/ 2.10
Du Pont	lb.	1.32	/ 1.80
Indian Red	lb.	.1175	/ .12
Iron oxide, red	lb.	.0525	/ .0925
Light	lb.	.1175	/ .12
Mapico	lb.	.1225	/ .125
Red Paste #17, 1-2	lb.	.95	/ 1.10
Rub-Er-Red	lb.	.0975	
Stan-Tone	lb.	1.10	/ 3.05
Toners	lb.	.25	/ 4.15

White

Antimony oxide	lb.	.34	/ .36
Burgess Iceberg	ton	50.00	
Lithopone, titanated	lb.	.09½	/ .10½
Cryptone BT	lb.	.09½	/ .10½
Titanium pigments			
Rayox LW	lb.	.195	/ .205
R-110	lb.	.215	/ .225
Ti-Cal	lb.	.075	/ .0825
Ti-Pure	lb.	.195	/ .225
Titanox A-168, -LO, -MO	lb.	.195	/ .205
RA, RA-10	lb.	.215	/ .225
RCHT	lb.	.075	/ .08
Zopaque	lb.	.195	/ .205
Zinc oxide, comml.	lb.	.16	/ .1925
Azo ZZZ-11, -44, -55	lb.	.16	/ .17
-66	lb.	.1825	/ .1925
35% leaded	lb.	.16⅝	/ .17⅝
Eagle AAA, lead free	lb.	.16	/ .17
5% leaded	lb.	.16	/ .17
35% leaded	lb.	.16⅝	/ .17⅝
50% leaded	lb.	.16⅞	/ .17⅞
Florence Green Seal	lb.	.1775	/ .1875
Red Seal	lb.	.1725	/ .1825
White Seal	lb.	.1825	/ .1925
Horsehead XX-4, -78	lb.	.16	/ .17
Kadox-15, -17, -22	lb.	.16	/ .17
-25	lb.	.1825	/ .1925
Lehigh, 35% leaded	lb.	.16⅝	/ .17⅝
50% leaded	lb.	.16⅞	/ .17⅞
Protox-166, -167	lb.	.16	/ .17
St. Joe, lead free	lb.	.16	/ .17
Standard, 5% leaded	lb.	.16	/ .17
Zinc sulfide, comml.	lb.	.24	/ .25
Cryptone ZS	lb.	.20	/ .21

Yellow

Cadmium yellow lithopone	lb.	1.32	
Chrome	lb.	.32	
Du Pont	lb.	1.62	/ 2.15
Iron oxide, yellow	lb.	.0141	/ .0975
Mapico	lb.	.10	/ .1025
Stan-Tone	lb.	1.00	/ 1.55
Toners	lb.	.50	/ 1.37
Yellow D	lb.	1.25	/ 1.35

Dispersing Agents

Darvan Nos. 1, 2	lb.	$0.21	/ $0.30
Stan-Chem	lb.	.1225	/ .2587
Triton R-100	lb.	.12	/ .25

Dusting Agents

D-Tac	lb.	.21	/ .23
Extrud-o-Lube, conc.	gal.	1.65	
Glycerized Liquid, Lubricant, concentrated	gal.	1.48	
Lubrex	lb.	.25	/ .30
Mica	lb.	.07	/ .0775
Pyrax A	ton	12.50	
W. A.	ton	15.00	
Snow Crest Talc	ton	33.00	/ 35.00
Vanfre	gal.	2.00	/ 2.50

Extenders

B. R. S. 700	lb.	.0175	/ .026
B. R. T. No. 7	lb.	.0265	/ .0275
Diclex B	lb.	.06	
Factice, Amberex	lb.	.30	/ .38
Brown	lb.	.12	/ .33
Neophax	lb.	.18	/ 1.35
Ozonite	lb.	.2365	
White	lb.	.13	/ .32
G. B. Asphaltenes	lb.	.06	/ .065
Mineral Rubbers			
Black Diamond	ton	38.00	/ 40.00
Extender 600	lb.	.18	
Hard Hydrocarbon	ton	38.00	/ 40.00
No. 38	ton	38.00	/ 40.00
Parmr	ton	21.00	/ 29.00
Nuba No. 1, 2	lb.	.04	
3X	lb.	.065	
Rubber substitute, brown	lb.	.18	/ .317
White	lb.	.16	/ .33
Sublac B-2, PX-5	lb.	.26	/ .28
Synthetic 100	lb.	.41	

Fillers, Inert

Barytes, floated, white	ton	37.60	/ 61.75
Off-color, domestic	ton	19.00	/ 20.00
No. 1	ton	37.60	/ 52.40
2	ton	35.60	/ 50.40
Blanc fixe	ton	95.00	/ 140.00
Clays			
Albacar	ton	40.00	/ 50.00
Aluminum Flake	ton	16.00	/ 22.00
#5	ton	21.00	
Champion	ton	14.00	
Crown	ton	14.00	/ 33.00
Hi-White R	ton	13.50	/ 33.00
Hydratex R	ton	30.00	
Paragon	ton	13.50	/ 31.50
McNamee	ton	13.50	
RX-43	ton	33.00	
Stan-Tex White	ton	25.00	
Stellar-R	ton	50.00	
Suprex	ton	14.00	/ 33.00
W-1291 English	ton	53.00	/ 55.00
Witco #1	ton	14.00	/ 30.00
#2	ton	13.50	/ 30.00
Cryptone BA, CB, MS	lb.	.08	/ .0825
Flocks			
Cotton, dark	lb.	.095	/ .112
Dyed	lb.	.45	/ .85
White	lb.	.12	/ .20
Fabrifil X-24-G	lb.	.095	
X-24-W	lb.	.135	
Filfloc 6000	lb.	.16	
F-40-900	lb.	.105	
Solka-Floc	lb.	.05	/ .15
Kalite	ton	40.00	
Lithopone, comml.	lb.	.075	/ .085
Albalith	lb.	.075	/ .085
Astrolith	lb.	.06⅜	/ .0675
Eagle	lb.	.0725	/ .075
Sunolith	lb.	.06⅜	/ .0675
Mica	lb.	.07	/ .0775
No. 1 Silica	ton	22.00	/ 40.00
Purecal D	ton	50.00	/ 65.00
M	ton	45.00	/ 65.00
Pyrax A	ton	12.50	
W. A.	ton	15.00	
SL Slate Flour	ton	17.00	/ 25.00
Suspenso	ton	22.00	
Swansdown	ton	20.00	
Terra Alba 1319	ton	27.00	
Ti-Cal	lb.	.0675	
Whiting, limestone	ton	6.00	/ 15.00
Paxinosa	ton	9.00	/ 17.00
Witco	ton	8.50	

Finishes

Black-Out	gal.	4.50	/ 8.00
Flexible Rubber Paints	gal.	4.00	/ 9.00
Flocks			
Cotton, dark	lb.	.095	/ .112
Dyed	lb.	.45	/ .85
White	lb.	.12	/ .20
Rayon, colored	lb.	.90	/ 1.50
White	lb.	.75	/ 1.25
Rubber lacquer, clear	gal.	1.00	/ 2.00
Colored	gal.	2.00	/ 3.50
Shoe varnish	gal.	1.45	
Talc	ton	12.50	/ 35.00
Wax, Bees	lb.	.78	/ .81
Carnauba	lb.	1.22	/ 1.38
Montan	lb.	.155	/ .32
No. 118, colors	gal.	.86	/ 1.41
Neutral	gal.	.76	/ 1.31
Van Wax	gal.	1.25	/ 1.30

Latex Compounding Ingredients

Accelerator 89	lb.	1.20	
122	lb.	1.30	
552	lb.	1.80	
Aerosol	lb.	.35	
Agerite Dispersions	lb.	$0.60	/ $2.25
Amberex Solutions	lb.	.1675	/ .18
Aquablaks	lb.	.0725	/ .1775
Aquarex D	lb.	.80	
L Paste	lb.	.94	
MDL Paste	lb.	.33	
ME	lb.	.97	
NS	lb.	.60	
SMO	lb.	.50	
WA Paste	lb.	.28	
Areskap 50	lb.	.30	/ .38
100, dry	lb.	.60	/ .72
Aresket 240	lb.	.30	/ .38
300, dry	lb.	.60	/ .72
Aresklene 375	lb.	.42	/ .57
400, dry	lb.	.70	/ .84
Black No. 25, dispersed	lb.	.22	
Casein	lb.	.29	/ .37
CW-12	lb.	.85	
CW-37	lb.	.70	
DC Antifoam A	lb.	5.65	/ 6.65
Dispersed Sulfur No. 2	lb.	.10	/ .12
Ethyl Thiurad	lb.	1.00	
Factice dispersions	lb.	.23	/ .44
Habuco Resin Emulsion			
#226	lb.	1.05	
#2246	lb.	1.30	
#2402, #2343	lb.	1.60	
Laton L	lb.	.075	/ .0775
Ludox	lb.	.1675	/ .1925
Marmix	lb.	.36	/ .43
Methocel	lb.	.62	/ .80
Micronex, colloidal	lb.	.06	/ .07
Pip-Pip	lb.	2.00	
Pliolite Latex 150, 190	lb.	.32	/ .41
170	lb.	.37	/ .46
Polyca 117-SS	lb.	.18	/ .265
296	lb.	.13	/ .185
350	lb.	.25	/ .37
R-2 Crystals	lb.	1.95	
Resin Emulsion A-155	lb.	.13	/ .18
P-370	lb.	.125	/ .175
Resin V	lb.	.13	
Santomerse D	lb.	.44	/ .65
S	lb.	.13	/ .25
Setsit No. 5	lb.	1.00	
SPDX-GL	lb.	.95	
Stablex A	lb.	.90	/ 1.10
B	lb.	.50	/ .95
G	lb.	.50	/ .70
L	lb.	.30	/ .40
Sulfur Dispersion, 50%	lb.	.07	/ .15
66⅔%	lb.	.09	/ .17
73%	lb.	.10	/ .12
Tergitol wetting agents	lb.	.265	/ .37
Thiocarbanilide (A-1)	lb.	.44	/ .51
Zinc oxide, dispersed	lb.	.13	/ .20

Mold Lubricants

Aquarex D	lb.	.76	
L Paste	lb.	.85	
MDL Paste	lb.	.30	
WA Paste	lb.	.25	
Carbowax compounds	lb.	.29	/ .295
Colite Concentrate	gal.	.90	/ 1.15
ELA	lb.	.80	
DC Mold Release Fluid	lb.	4.14	/ 6.00
Emulsion Nos. 35, 35A, 35B	lb.	1.68	/ 3.50
DC 7	lb.	6.20	/ 6.80
Glycerized Liquid Lubricant, concentrated	gal.	1.48	
Lubrex	lb.	.25	/ .30
Mold Paste	lb.	.25	
Monten Wax	lb.	.57	
Para Lube	lb.	.046	/ .048
Polyethylene Glycols	lb.	.23	
Sodium stearate	lb.	.51	/ .56
Stearite	lb.	.095	/ .10
Vanfre	gal.	2.00	/ 2.50

Odorants

Alamasks	lb.	.60	/ 6.50
Curodex 19	lb.	4.75	
188	lb.	5.75	
198	lb.	6.75	
Rodo No. 0	lb.	4.00	/ 4.50
No. 10	lb.	5.00	/ 5.50

Plasticizers and Softeners

Akroflex C	lb.	.61	/ .63
Aro Lene #1980	lb.	.10	/ .12
Bardol	lb.	.025	/ .035
639	lb.	.025	/ .0425
B	lb.	.0575	/ .06
Bondogen	lb.	.55	/ .60
BRC 20	lb.	.015	/ .016
30	lb.	.0115	/ .02
521	lb.	.019	/ .02
B. R. H. No. 2	lb.	.02	/ .029
B. R. S. 700	lb.	.0175	/ .026
B. R. T. No. 7	lb.	.0265	/ .0275
B. R. V.	lb.	.035	/ .0515
Bunarex Liquid	lb.	.0425	/ .0555
Resins	lb.	.065	/ .1225
Bunnatol G. S.	lb.	.40	/ .505
Butac	lb.	.125	/ .135
BxDC	lb.	.40	/ .41
Cabflex DI-BA	lb.	.42	/ .4475
-OA	lb.	.435	/ .4625
-OP	lb.	.40	/ .4275
Carbonex	lb.	.0325	/ .0375
664	lb.	.0375	/ .0425
645	lb.	.036	/ .0385
S	lb.	.0425	/ .0475
S Plastic	lb.	.041	/ .046
Contogums	lb.	.0875	/ .111
Cumar EX	lb.	.0525	
MH	lb.	.065	/ .11
V	lb.	.0975	/ .1275

RMP
ANTIMONY
FOR RED RUBBER

. . . . The utmost in pleasing appearance with no deteriorating effect whatever.

●

RARE METAL PRODUCTS CO.
ATGLEN, PA.

CRUDE RUBBER

TO SERVE OUR OLD AND NEW FRIENDS IN THEIR REQUIREMENTS

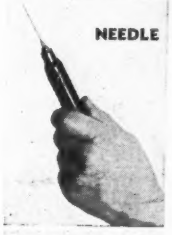
ESTABLISHED 1903

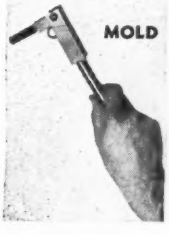
BAIRD RUBBER
AND TRADING COMPANY

233 Broadway, New York, N. Y.
WOrth 4-1460

Surface
PYROMETERS
for every purpose

The routine use of CAMBRIDGE Surface Pyrometers takes the guesswork out of temperature determination in many industries. The CAMBRIDGE is accurate, dependable, rugged, quick-acting and easy to use. The Roll Model is for checking surface temperatures of moving rolls. The Needle Model is for insertion into materials in a plastic or semi-plastic state for batch temperature determination. The Mold Model is for checking surface temperatures of mold cavities and surfaces of almost any contour.





Send for Bulletin 194SA.

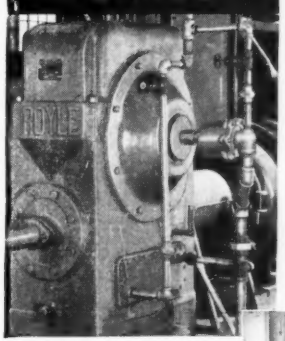
CAMBRIDGE INSTRUMENT CO., INC.
3709 Grand Central Terminal
New York 17, N. Y.

CAMBRIDGE
PIONEER MANUFACTURERS OF
PRECISION INSTRUMENTS

Moisture Indicators and Recorders • Physical Testing Instruments
Laboratory Instruments for A. C. & D. C. • Galvanometers
Engineering Instruments • Gas Analysis Equipment • Physiological Instruments
and many other Mechanical and Electrical Instruments

JOHNSON
Rotary Pressure
JOINTS

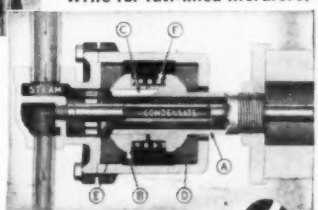
Setting a New Pace in the Rubber Industry



When it comes to admitting heating or cooling agents to rotating rolls or drums, the Johnson Joint completely outmodes the old style stuffing boxes. It saves enough in reduced maintenance alone to pay its own way quickly—it is completely packless, self-lubricating, self-adjusting and even self-aligning. In addition, it can materially benefit over-all production—by ending many causes of machinery shut-down, by its more efficient performance, by facilitating better roll drainage.

Write for fact-filled literature.

Johnson Joint installed on rubber extruder. Photo courtesy of Manhattan Rubber Div., Raybestos-Manhattan, Inc.



Rotating member consists of Nipple (A) and Collar (B), keyed together (C). Seal ring (D) and bearing ring (E) are of self-lubricating carbon graphite. Spring (F) is for initial seating only; joint is pressure sealed in operation.

The JOHNSON CORPORATION, 869 Wood St., Three Rivers, Mich.

Dielex R	lb.	$0.06		
Dipolymer Oil	gal.	.33	/	$0.38
Dispersing Oil No. 10	lb.	.055	/	.0575
Duraplex C-50 LV, 100%	lb.	.25	/	.295
Dutrex 6	lb.	.025	/	.035
Flexol Plasticizer 3GH	lb.	.42	/	.44
3GO	lb.	.515	/	.535
4GO	lb.	.36	/	.38
8N8	lb.	.375	/	.395
DOP	lb.	.43	/	.455
R-I	lb.	.47	/	.475
TOF	lb.	.47	/	.49
TWS	lb.	.405	/	.425
Galex W-100	lb.	.135	/	.1725
W-100D	lb.	.1325	/	.17
Gilsowax B	lb.	.09	/	.11
Heavy Resin Oil	lb.	.0225	/	.0375
Hercolyn	lb.	.1112	/	.1347
Indonex	gal.	.11	/	.17
Nevillac oils	lb.	.33		
Resins	lb.	.31	/	.45
Neville LX-685	lb.	.12		
R Resins	lb.	.105	/	.155
Nevinol	lb.	.17		
Nevoil	lb.	.0325	/	.0425
No. 1-D heavy oil	lb.	.055		
Palmalene	lb.	.15		
Panaflex BN-1	lb.	.18	/	.2325
Para Flux, regular	gal.	.10	/	.2025
No. 2016	gal.	.165	/	.24
Heavy	gal.	.155		
Para Lube	lb.	.046	/	.048
Para Resins	lb.	.04	/	.045
Paradene Resins	lb.	.065	/	.075
Peptizene #2	lb.	.90		
Pepton 22	lb.	.72	/	.75
Picco Resins	lb.	.13	/	.185
480 Oilproof Series	lb.	.18	/	.23
S. O. S.	gal.	.29	/	.34
Piccocizers	lb.	.04	/	.068
Piccolastic Resins	lb.	.1855	/	.34
Piccolyte Resins	lb.	.185	/	.25
Piccoumaron Resins	lb.	.07	/	.185
Piccovars	lb.	.145	/	.20
Piccovol	lb.	.025	/	.038
Pictar	gal.	.25	/	.30
Pigmentar	gal.	.041	/	.0511
Pigmentaroil	gal.	.041	/	.0511
Plastender S	lb.	.04	/	.0425
Plasticizer 35	lb.	.205	/	.24
36	lb.	.305	/	.34
42	lb.	.34	/	.40
2175	lb.	.46	/	.56
3425	lb.	.605		
3497	lb.	.61		
3560	lb.	.56		
B	lb.	.35	/	.45
SC	lb.	.50	/	.57
Plastogen	lb.	.0775	/	.08
Plastone	lb.	.22	/	.30
Polymel 6	lb.	.0675	/	.10
7	lb.	.23	/	.28
C-128	lb.	.195	/	.205
D, H-2	lb.	.22	/	.24
PT67 Light Pine Oil	gal.	.50	/	.60
101 Pine Tar Oil	lb.	.041	/	.0534
400 Light Pine Tar	lb.	.041	/	.0534
600 Med. Pine Tar	lb.	.041	/	.0534
R-19, R-21 Resins	lb.	.1075		
Reogen	lb.	.1175	/	.12
Resin C pitch	lb.	.02	/	.0285
R6-3	lb.	.38	/	.40
Resinex	lb.	.0325	/	.0375
L-4	lb.	.0225	/	.03
Rosin Oil, Sunny South	gal.	.50	/	.66
RPA No. 2	lb.	.75		
No. 3 RO	lb.	.49		
5	lb.	.57		
RSN Flux	gal.	.10	/	.19
Rubber Oil B-5	lb.	.0225	/	.0355
Rubberol	lb.	.2575		
S-Polymers	lb.	.44		
Santicizer B-16	lb.	.52	/	.57
E-15	lb.	.49	/	.54
M-17	lb.	.46	/	.51
No. 140	lb.	.3225	/	.38
Seedine	lb.	.1485	/	.1705
Softener #20	gal.	.10	/	.20
Solvenol	gal.	.56	/	.58
Staybelite Resin	lb.	.06	/	.065
Stearex Beads	lb.	.147⅛	/	.157⅛
Stearite	lb.	.095	/	.10
Syn-Tac	gal.	.33	/	.35
Synthol	lb.	.205		
TR-11	lb.	.035		
Turgum S	lb.	.1075	/	.1175
Tysonite	lb.	.215	/	.2225
X-1 Resinous Oil	lb.	.0175	/	.0325
XX-100 Resin	lb.	.0525		

Reclaiming Oils

Bardol	lb.	.025	/	.035
639	lb.	.025	/	.0425
B	lb.	.0575	/	.06
B. R. H. No. 2	lb.	.02	/	.029
B. R. T. No. 4	lb.	.0225	/	.0235
B. R. V	lb.	.035	/	.0515
BWH-1	lb.	.14		
Dipolymer Oil	gal.	.33	/	.43
Dispersing Oil No. 10	lb.	.055	/	.0575
Heavy Resin Oil	lb.	.0225	/	.0375
LX-77	gal.	.18	/	.30
-572	gal.	.23	/	.34
No. 1621	lb.	.025	/	.035
3186	gal.	.28	/	.295
Picco 6335	gal.	.25	/	.30
C-33	gal.	.215	/	.315
C-42	gal.	.23	/	.33
D-4	gal.	$0.27	/	$0.37
E-5	gal.	.25	/	.35
Q-Oil	gal.	.286	/	.386
PT 101 Pine Tar Oil	lb.	.041	/	.0534
150 Pine Solvent	gal.	.44	/	.55
RR-10	lb.	.35		
Solvenol	gal.	.56	/	.58
S. R. O.	lb.	.015	/	.0225
Wilcor Nos. 111, 151	gal.	.26	/	.30
X-1 Resinous Oil	lb.	.0175	/	.0325
-60 Solvent	gal.	.24	/	.38

Reinforcers, Other Than Carbon Black

Amorez 11-190	lb.	.04	/	.055
BRC 20	lb.	.015	/	.016
30	lb.	.0115	/	.02
521	lb.	.019	/	.02
Bunarex resins	lb.	.065	/	.1225
Calcene T	ton	60.00	/	80.00
Calco S. A.	lb.	.80	/	.83
Carbonex	lb.	.0325	/	.0375
644	lb.	.0375	/	.0425
645	lb.	.036	/	.0385
S	lb.	.0425	/	.0475
S Plastic	lb.	.041	/	.046
Clays				
Aluminum Flake	ton	16.50	/	22.50
No. 5	ton	21.00		
Buca	ton	40.00		
Burgess Iceberg	ton	50.00		
Pigment No. 20	ton	35.00		
No. 30	ton	37.00		
Polyclay	ton	45.00		
Catalpo	ton	30.00		
Crown	ton	14.00	/	33.00
Dixie	ton	14.00		
Hydratex R	ton	30.00		
L. G. B.	ton	17.00		
Paragon (R)	ton	13.50	/	31.50
Pigment No. 33	ton	30.00		
Suprex	ton	14.00	/	32.00
Witco No. 1	ton	14.00	/	30.00
No. 2	ton	13.50	/	30.00
Clearcarb	lb.	.1175	/	.1225
Cumar EX	lb.	.0525		
MH	lb.	.065	/	.1175
V	lb.	.0975	/	.1275
G Resin	lb.	.08		
Good-rite Resin 50	lb.	.36	/	.38
Hi-Sil	lb.	.11	/	.125
Kralac A	lb.	.39	/	.50
Magnesia, calcined	lb.	.31	/	.3475
Marbon resins	lb.	.38	/	.45
Millical	ton	27.50		
Multiflex MM	ton	105.00		
Special	ton	125.00		
Neville R Resins	lb.	.10	/	.155
Panarez resins	lb.	.04	/	.13
Para Resins 2457, 2718	lb.	.04	/	.45
Pico Resins	lb.	.13	/	.185
Piccolyte Resins	lb.	.185	/	.25
Piccoumaron Resins	lb.	.07	/	.185
Piccovars	lb.	.145	/	.20
Pliolite, S-3, -6, -6B	lb.	.41	/	.48
S-6 Masterbatches	lb.	.42	/	.69
PS-60 Resin	lb.	.35		
Purecal U	ton	120.00	/	135.00
Resin C Pitch	lb.	.02	/	.0285
Resinex	lb.	.0325	/	.0375
Rubber Resin LM-4	lb.	.28	/	.35
S-Polymers	lb.	.44		
Silene EF	ton	120.00	/	140.00
L	ton	125.00	/	145.00
Witcarb R	ton	105.00	/	120.00
R-12	ton	45.00	/	66.00
Zinc oxide, commercial†	lb.	.16	/	.1925

Retarders

Cumar RH	lb.	.105		
Delac J	lb.	.55	/	.60
E-S-E-N	lb.	.36		
Good-rite Vultrol	lb.	.55	/	.57
R-17 Resin	lb.	.1075		
Retarder ASA	lb.	.55		
PD	lb.	.34	/	.36
W	lb.	.43		
Retardex	lb.	.51	/	.54
RM	lb.	1.25		
Thionex	lb.	1.25		
Vultrol	lb.	.50	/	.55

Solvents

Bondogen	lb.	.55	/	.60
Cosol	gal.	.30	/	.38
Dichloro Pentanes	lb.	.04	/	.07
Dipentene DD	gal.	.47	/	.50
GVL	lb.	1.00		
Nevsol	gal.	.185	/	.25
Panasol High-Solvency Naphtha	gal.	.19	/	.28
Penetrell	gal.	.47	/	.50
Picco Hi-Solv Solvents	gal.	.17	/	.24
Pine Oil D.D.	gal.	.755	/	.765
PT 150 Pine Solvent	gal.	.44	/	.55
Skellysolve-E	gal.	.153		
-H	gal.	.133		
-R, -V	gal.	.109		
-S	gal.	.099		
Tollac	gal.	.195	/	.25
2 50-W Hi-Flash Solvent	gal.	.37		

Synthetic Resins

Geon Latices (dry wt.)	lb.	.465	/	.60
Paste Resins	lb.	.34	/	.60
Plastics	lb.	.365	/	.85
Polyblend	lb.	.43	/	.58
Polyvinol resins	lb.	.34	/	.58
Marvinol VR-10, -20	lb.	.36	/	.52

Synthetic Rubbers and Latices

Chemigum 30N4NS, 50N4NS	lb.	$0.50	/	$0.57
N1NS	lb.	.64	/	.71
N3NS	lb.	.58	/	.65
Latex (dry wt.)				
101-A, -AX, -E	lb.	.32	/	.41
200	lb.	.425	/	.525
235-A, -B	lb.	.50	/	.60
245-A, -B	lb.	.425	/	.525
Hycar OR-15, -15EP	lb.	.52	/	.53
OR-25, -25 EP	lb.	.45	/	.46
OR-25 NS	lb.	.47	/	.48
OS-10	lb.	.50	/	.51
Hycar Latex (dry wt.)				
1501, 1531, 1551	lb.	.49	/	.54
1502, 1552, 1562	lb.	.42	/	.47
1532	lb.	.435	/	.485
Neoprene Latex (dry wt.)				
Type 571, 842, 842-A	lb.	.35	/	.46
572, 700	lb.	.36	/	.47
601, 601-A	lb.	.38	/	.49
735	lb.	.36	/	.47
Neoprene Type AC, CG	lb.	.50	/	.53
E	lb.	.65	/	.68
FR	lb.	.80	/	.83
KNR	lb.	.75	/	.78
GN, GN-A, S	lb.	.38	/	.41
RT, W	lb.	.40	/	.43
Paracril 18-80	lb.	.43	/	.45
26NS60, 26NS90	lb.	.44	/	.46
35NS90	lb.	.51	/	.53
Paracril Latex Type H (55%)	lb.	.38	/	.42
Paraplex X-100	lb.	1.00		
Silastic	lb.	2.35	/	4.05

Tackifiers

Bunarex resins	lb.	.065	/	.1225
Contogums	lb.	.0875	/	.11
Galex W-100	lb.	.135	/	.1725
W-100D	lb.	.1325	/	.17
Hercolyn	lb.	.1122	/	.1347
Indopol H-100	gal.	.85	/	1.00
H-300	gal.	1.12	/	1.27
Natac	lb.	.12	/	.13
Nevindene	lb.	.125	/	.155
Picco resins	lb.	.13	/	.185
Piccolastic resins	lb.	.1855	/	.34
Piccolyte resins	lb.	.185	/	.25
Piccoumaron resins	lb.	.07	/	.185
Staybelite Resin	lb.	.06	/	.065
Synthetic 100	lb.	.41		
Synthol	lb.	.2475		

Vulcanizing Agents

Dibenzo G-M-F	lb.	2.50		
Ethyl Tuads	lb.	1.00		
G-M-F	lb.	2.50		
Litharge, commercial	lb.	.1875	/	.206
Eagle, sublimed	lb.	.1975	/	.1985
National Lead	lb.	.205	/	.206
Magnesia, calcined	lb.	.31	/	.3475
Methyl Selenac	lb.	1.60		
Tuads	lb.	1.10		
Red Lead, commercial	lb.	.1975	/	.22
Eagle	lb.	.2075		
National Lead	lb.	.215		
Sulfur flour, comml.	100 lbs.	1.70	/	2.20
Black Bird	lb.	.036	/	.041
Calco	lb.	.0195	/	.053
Crystex	lb.	.195		
Insoluble 60M	lb.	.125	/	.13
Rubbermakers	100 lbs.	2.25	/	3.80
Spider Brand	lb.	.023	/	.044
Stauffer	lb.	.0175	/	.0285
Telloy	lb.	2.00		
Vandex	lb.	2.00		
Vultac Nos. 1, 2	lb.	.45	/	.47
No. 3	lb.	.49	/	.51
White lead silicate	lb.	.1625	/	.2225
Eagle	lb.	.2025	/	.2225
National Lead	lb.	.1625	/	.1725

Aluminum Co. of Canada, Ltd., has begun production of anhydrous aluminum chloride at its Arvida, Ont., plant. Annual output of the plant will be about 3,000 tons, enough to supply the entire Canadian market and leave a considerable portion for export. The chief domestic consumer will be Polymer Corp., Ltd., Sarnia, Ont., which has contracted to take 300-400 tons annually, for use as a catalyst in the synthetic rubber manufacturing process. Polymer has been importing all its requirements for anhydrous aluminum chloride from the United States, where the chemical has come into tight supply during recent months. The chemical is also used in the manufacture of high octane gasoline, lubricants, dyes, pharmaceuticals, and cosmetics. Aluminum Co. will use aluminum scrap and chlorine from its Arvida chlorine and caustic soda plant in the manufacture of the chemical.

HI-SIL SILENE EF in GR-S

get these facts NOW

on changing-over from natural rubber compounds to GR-S —to prepare for increased restrictions

The reinforcing pigments in GR-S must be of considerably higher quality than required in natural rubber. In fact, only with top quality pigments can the properties of white or colored natural rubber compounds be approached in GR-S.

HI-SIL* and SILENE EF**—two exclusive Columbia products—offer the highest quality in non-black reinforcing pigments for partial or complete replacement. You may obtain information and working samples by writing Pittsburgh Plate Glass Company, Columbia Chemical Division, Fifth at Bellefield, Pittsburgh 13, Pa.

*Precipitated hydrated silicon dioxide

**Precipitated hydrated calcium silicate

Write for these free COLUMBIA PIGMENT DATA *Sheets:*

No. 50-10. Acceleration of Hi-Sil Compounds with Thiazole-Guanidine Combinations.

No. 50-3. Compounding of Low Temperature GR-S with a New Fine Particle Silica.

Compounding of GR-S with a New Fine Particle Silica. (Reprinted from India Rubber World, August, 1949.)

No. 47-7. Silene EF and Calcene T in GR-S 10.

No. 47-4. Comparison of Mixtures of Calcene T and Silene EF with other Fine Calcium Carbonates in GR-S at Medium and High Loadings.

No. 47-1. General Compounding Data of Silene EF and GR-S Formulations.

No. 45-1. The effect of Varying Quantities of Ethylene Glycol on the Properties of GR-S Stocks Containing Silene EF.

COLUMBIA CHEMICALS

CHICAGO • MINNEAPOLIS • BOSTON
NEW YORK • CINCINNATI
ST. LOUIS • CHARLOTTE • PITTSBURGH
CLEVELAND • PHILADELPHIA

PAINT • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Exports of Domestic Merchandise

	November, 1950 Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	5,996	$2,992
Chicle and chewing gum bases	437,398	176,792
Balata	3,830	10,565
Synthetic rubbers: GR-S	14,263	3,697
Neoprene	1,024,618	381,887
Nitrile	257,854	125,025
Polyisobutylene	3,328	1,267
Other, except Butyl and "Thiokol"	859	603
Reclaimed rubber	2,770,100	256,250
Scrap rubber	6,944,458	216,844
TOTALS	11,462,704	$1,175,922
MANUFACTURED		
Rubber cement, *gals.*	100,457	$234,539
Rubberized fabric:		
Auto cloth, *sq. yds.*	7,907	8,821
Piece goods and hospital sheeting, *sq. yds.*	101,337	70,620
Rubber footwear:		
Boots, *prs.*	5,611	23,616
Shoes, *prs.*	2,665	3,611
Rubber-soled canvas shoes, *prs.*	11,942	20,157
Soles, *doz. prs.*	16,185	52,299
Heels, *doz. prs.*	46,147	41,896
Soling and toplift sheets, *lbs.*	362,798	65,943
Gloves and mittens, *doz. prs.*	13,521	44,857
Drug sundries: water bottles and fountain syringes, *no.*	26,653	18,315
Other	.....	238,491
Rubber and rubberized clothing	.....	114,289
Toy and novelty balloons	.....	32,394
Rubber toys and balls	.....	35,483
Erasers, *lbs.*	27,591	21,624
Hard rubber goods:		
Battery boxes, *no.*	21,346	33,567
Other electrical goods, *lbs.*	148,635	83,180
Combs, finished, *doz.*	1,753	2,929
Other	.....	15,837
Tires and casings:		
Truck and bus, *no.*	76,168	3,334,213
Auto, *no.*	75,579	1,177,768
Aircraft	.....	70,305
Farm tractor, etc., *no.*	5,194	196,204
Other off-the-road, *no.*	6,490	623,754
Bicycle, *no.*	13,988	19,037
Motorcycle, *no.*	634	6,051
Other, *no.*	1,716	38,715
Inner tubes: auto, *no.*	50,242	116,676
Truck and bus, *no.*	51,822	211,291
Aircraft, *no.*	669	3,900
Other, *no.*	12,039	34,880
Solid tires: truck and industrial, *no.*	1,068	39,194
Other, *lbs.*	1,015	183
Tire repair materials:		
Camelback, *lbs.*	268,592	86,981
Other, *lbs.*	255,512	212,197
Rubber and friction tape, *lbs.*	57,217	31,805
Belting: auto and home, *lbs.*	114,869	142,913
Transmission:		
V-belts, *lbs.*	114,431	225,034
Flat belts, *lbs.*	43,752	65,664
Other, *lbs.*	17,276	23,189
Conveyer and levitator, *lbs.*	63,944	62,196
Other, *lbs.*	5,825	857
Hose and tubing, *lbs.*	445,274	352,121
Packing, *lbs.*	150,219	164,483
Mats, flooring, tiling, *lbs.*	451,709	126,249
Thread: bare, *lbs.*	17,034	26,106
Textile covered, *lbs.*	17,502	46,021
Gutta percha manufactures, *lbs.*	340	405
Latex and other rubber compounds for further manufacture, *lbs.*	1,056,450	307,752
Other natural and synthetic rubber manufactures	.....	468,335
TOTALS	.....	$9,376,947
GRAND TOTALS, ALL RUBBER EXPORTS	.....	$10,552,869

Reexports of Foreign Merchandise

	November, 1950 Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	1,352,257	$724,050
Chicle and chewing gum bases	3,740	3,497
Balata	5,612	2,950
TOTALS	1,361,609	$730,497
MANUFACTURED		
Rubber soling and toplift sheets, *lbs.*	8,319	$3,701
Drug sundries, except hot water bottles and fountain syringes	.....	453
Rubber toys and balls	.....	2,869
Hard rubber combs, *doz.*	660	565
Tires and casings:		
Truck and bus, *no.*	38	3,723
Auto, *no.*	4	100
Other natural and synthetic rubber manufactures	.....	315
TOTALS	.....	$11,726
GRAND TOTALS, ALL RUBBER REEXPORTS	.....	$742,223

Imports for Consumption of Crude and Manufactured Rubber

	November, 1950 Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	153,355,719	$62,121,636
Latex	10,981,031	6,227,022
Crude chicle	1,649,523	1,359,088
Guayule	64,601	21,616
Balata	832,176	311,959
Jelutong or Pontianak	390,214	132,632
Gutta percha	141,810	146,707
Synthetic rubber	4,414,718	898,048
Reclaimed rubber	209,998	22,196
Scrap rubber	6,726,772	202,535
TOTALS	178,766,562	$71,443,439
MANUFACTURED		
Tires and casings:		
Auto, etc., *no.*	2,197	$95,344
Bicycle, *no.*	4,187	5,507
Inner tubes: auto, etc., *no.*	466	1,361
Rubber footwear:		
Boots, *prs.*	39,789	58,779
Shoes and overshoes *prs.*	12,816	7,604
Rubber-soled canvas shoes, *prs.*	17,601	11,213
Athletic balls: golf, *no.*	76,560	20,376
Tennis, *no.*	87,264	9,742
Other, *no.*	123,084	16,210
Rubber toys, except balloons	.....	65,514
Hard rubber goods	.....	47,796
Rubberized printing blankets, *lbs.*	276	$ 765
Rubber and cotton packing, *lbs.*	266	657
Belting, *lbs.*	17,951	19,943
Hose	.....	2,869
Drug sundries	.....	13,481
Rubber instruments, *doz.*	5,040	10,826
Other rubber products	.....	725
Gutta percha manufactures, *lbs.*	1,961	1,465
Rubber heels and soles *lbs.*	6,500	2,096
Bands, *lbs.*	8,840	8,479
Synthetic rubber products	.....	22
Other soft rubber goods	.....	177,792
TOTALS	.....	$578,566
GRAND TOTALS, ALL RUBBER IMPORTS	.....	$72,022,005

SOURCE: Bureau of Census, United States Department of Commerce, Washington, D. C.

Polymer Corp. Expanding

The expansion program in its synthetic rubber manufacturing facilities is proceeding according to schedule, it was announced by Polymer Corp., Ltd., Sarnia, Ont. Indications are that the first rubber will be produced by the new facilities in July, but it will be fall before the full 25% boost in expansion is attained. Nearly all the extra output will go to the Canadian tire and rubber industry, which is anxious to use more synthetic rubber in its products because of its relatively low cost in comparison with natural rubber.

The Polymer plant, which once welcomed visitors, is now closed to the public in view of its important role in the defense program.

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory — December, November, 1950; Year 1950, 1949

	December, 1950	% of Change from Preceding Month	November, 1950	Year, 1950	Year, 1949
Passenger Casings					
Shipments					
Original equipment	2,801,120		2,853,022	36,683,934	28,128,583
Replacement	3,394,646		3,315,822	47,320,762	36,439,572
Export	67,292		77,859	652,983	508,565
TOTAL	6,263,058	+0.26	6,246,703	84,657,679	65,076,720
Production	5,635,980	−10.92	6,326,911	78,621,811	65,140,287
Inventory end of month	3,032,539	−15.67	3,596,186	3,032,539	8,903,731
Truck and Bus Casings					
Shipments					
Original equipment	443,456		359,672	4,665,943	3,455,781
Replacement	803,917		824,540	9,730,014	7,026,115
Export	62,399		72,784	771,901	958,420
TOTAL	1,309,772	+4.20	1,256,996	15,167,858	11,440,316
Production	1,175,150	−0.98	1,186,733	14,127,791	11,228,440
Inventory end of month	737,190	−14.09	858,048	737,190	1,734,456
Total Automotive Casings					
Shipments					
Original equipment	3,244,576		3,212,694	41,349,877	31,584,364
Replacement	4,198,563		4,140,362	57,050,776	43,465,687
Export	129,691		150,643	1,424,884	1,466,985
TOTAL	7,572,830	+0.92	7,503,699	99,825,537	76,517,036
Production	6,811,130	−9.35	7,513,644	92,749,602	76,368,727
Inventory end of month	3,769,729	−15.37	4,454,234	3,769,729	10,638,187
Passenger and Truck and Bus Tubes					
Shipments					
Original equipment	3,247,154		3,212,626	41,343,566	31,520,541
Replacement	3,088,811		2,831,488	42,096,927	31,449,820
Export	87,022		90,867	825,493	887,340
TOTAL	6,422,987	+4.69	6,134,981	84,265,986	63,857,701
Production	6,111,421	−8.96	6,712,604	80,612,625	65,114,220
Inventory end of month	6,608,314	−5.09	6,962,771	6,608,314	10,657,161

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

REPRINTS OF

GERMAN PATENTS

RELATING TO

VINYL POLYMERS

BY LAW VOGE AND M. HOSEH

NOW AVAILABLE

28 PAGES AND COVER

PRICE $1.00 PER COPY *POSTPAID*

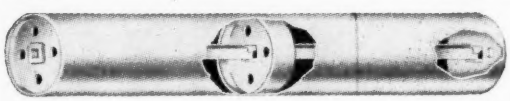
Remittance Must Accompany Order
Special Discounts on Quantity Orders

ADDRESS ORDERS TO

INDIA RUBBER WORLD
386 FOURTH AVE. NEW YORK 16

THE ALUMINUM FLAKE COMPANY
AKRON 14, OHIO
Manufacturers of
ALUMINUM FLAKE
A COLLOIDAL HYDRATED ALUMINUM SILICATE
REINFORCING AGENT for
SYNTHETIC and NATURAL RUBBER
New England Agents Warehouse Stocks
BERLOW AND SCHLOSSER CO.
401 INDUSTRIAL TRUST BUILDING
PROVIDENCE 3, RHODE ISLAND

STEEL CALENDER STOCK SHELLS



ALL STEEL, ALL WELDED CONSTRUCTION, with forged steel hubs for 1¼", 1½" and 2" square bars. 4", 5", 6", 8", 10", 12", 15", 20" and 24" diameters. Any length. Also Special Trucks (Leaf Type) Racks, Tables and Jigs.

Used in manufacturing rubber and plastic products.

THE W. F. GAMMETER COMPANY
CADIZ, OHIO

Eagle-Picher pigments

serve the rubber industry across the board

Eagle-Picher manufactures a comprehensive line of both lead and zinc pigments for the rubber industry. The quality and uniformity of our pigments, exact quality control methods of manufacturing, more than a century of experience... are the factors that make Eagle-Picher *serve you better.*

Zinc Oxides • Basic White Lead Silicate
Basic Carbonate of White Lead
Sublimed White Lead
Litharge • Sublimed Litharge
Red Lead (95%, 97%, 98%)
Sublimed Blue Lead

On the Pacific Coast:
Associated Lead & Zinc Co.
2700 16th Avenue, S. W.
Harbor Island, Seattle 4, Washington

EAGLE EP PICHER **THE EAGLE-PICHER COMPANY**
Since 1843
GENERAL OFFICES: CINCINNATI (1), OHIO

The KEY to Better Plastics
HARFLEX PLASTICIZERS

PHTHALATES ADIPATES
HARFLEX 500®
SEBACATES

THE KEY TO HARCHEM BETTER PLASTICS

BINNEY & SMITH CO.
SALES AGENTS TO THE RUBBER INDUSTRY
HARDESTY CHEMICAL CO., INC.
41 East 42nd Street, New York 17, N. Y.

DIC
50 Years in St. Louis

ALL TYPES OF
Sharp Edge
CUTTING DIES

Also an improved, effective hand operated die block scraper.

INDEPENDENT DIE & SUPPLY COMPANY
LaSalle & Ohio Sts. • St. Louis 4, Missouri

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

Effective July 1, 1947

GENERAL RATES
Light face type $1.25 per line (ten words)
Bold face type $1.60 per line (eight words)
Allow nine words for keyed address.

SITUATIONS WANTED RATES
Light face type 40c per line (ten words)
Bold face type 55c per line (eight words)

SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)
Bold face type $1.40 per line (eight words)
Letter replies forwarded without charge, but no packages or samples.

Address All Replies to New York Office at 386 Fourth Avenue, New York 16, N. Y.

SITUATIONS OPEN

CONTROL CHEMIST—So. Calif.

Foam Rubber experience necessary. Must know basic foam compounding and Maturation processes. Must be now employed in the foam rubber industry in this capacity. State age, education, experience, marital status in first letter. Starting salary $500 to $600 depending upon qualifications — unusual opportunity for rapid advancement. Reply to

BOX #734, c o INDIA RUBBER WORLD

COATED FABRIC EXPERT

TO DIRECT THE SETTING UP OF SPREADING EQUIPMENT AND SPECIFY FABRICATING PROCEDURES AND COMPOUNDS TO BE USED. EXPERIENCE NECESSARY IN SPREAD COATING FABRICS WITH RUBBER-LIKE MATERIALS. COMPOUNDING EXPERIENCE IMPORTANT. NATIONAL ORGANIZATION. STATE AGE, EXPERIENCE, AND SALARY REQUIRED.

ADDRESS BOX NO. 746, C/O INDIA RUBBER WORLD

RUBBER CHEMISTS

Plant making diversified lines of hose, mechanicals, calendered and coated products requires chemists experienced in these lines. Apply in writing only with details of background and experience.

ATLANTIC TUBING & RUBBER CO.
MILL STREET, CRANSTON 5, R. I.

OPPORTUNITY IN A SMALL CONNECTICUT RUBBER COMpany for a man experienced in the production of mechanical rubber products. Must be able to operate laboratory and production equipment and to train personnel. State age, draft status, experience, and salary expected. Address Box No. 747, care of INDIA RUBBER WORLD.

SITUATIONS OPEN (Continued)

SPONGE RUBBER CHEMIST—REQUIRE MAN WITH EXperience and capability. Permanent position with sound, well-financed company. Salary commensurate with ability. Forward detailed résumé of experience and qualifications to Box No. 735, care of INDIA RUBBER WORLD.

RESEARCH RUBBER COMPOUNDER, MUST HAVE TIRE factory experience in both natural and synthetic rubber. Address Box No. 736, care of INDIA RUBBER WORLD.

RUBBER CHEMIST: EXPERIENCE TO BE SUCH THAT APPLIcant can be trained in a reasonably short time to take charge of all rubber compounding for tire and miscellaneous goods plant located in vicinity of Toronto, Canada. State age, draft status, qualifications, and salary expected. Address Box No. 737, care of INDIA RUBBER WORLD.

MAN WANTED WHO HAS HAD PRACTICAL EXPERIENCE IN a rubber manufacturing plant. One who is capable of doing experimental and development work, as well as knowing manufacturing. Good opportunity for the right man who can help a fast-growing rubber plant to develop new products. Give full details. Address Box No. 738, care of INDIA RUBBER WORLD.

CHEMIST — EXPERIENCED IN PRESSURE-SENSITIVE ADhesive rubber, resins. Must have at least three years' experience in any of the above fields. State age, education, experience, and salary requirements in first letter. Address Box No. 744, care of INDIA RUBBER WORLD.

WANTED: CHIEF CHEMIST FOR LABORATORY IN MIDWEST location, who conducts chemical and physical tests on rubber. Must be an alert, aggressive good manager. State full details on education, experience, and salary requirements. Address Box No. 751, care of INDIA RUBBER WORLD.

MECHANICAL ENGINEER: EXCELLENT OPENING FOR TECHnically trained mechanical engineer with knowledge of or interest in rubber and plastic processing equipment and related activities for development work with major manufacturer. Salary to be commensurate with proven ability and experience. Location Chicago. Address Box No. 753, care of INDIA RUBBER WORLD.

PRODUCTION COATING SUPERVISOR: AN EXCELLENT OPportunity for a technically trained man with major experience in rubber and plastic coatings on fabric or paper plus knowledge of solution mixing, storage and handling of plastic and rubber solutions and spreaders and ovens to assume supervisory responsibility in an enlarging production section of a major manufacturer. Production primarily concerned with adhesives. Salary and responsibility to be commensurate with ability. Location Chicago. Address Box No. 754, care of INDIA RUBBER WORLD.

SITUATIONS WANTED

RUBBER CHEMIST—AKRON, O., AREA. PART-TIME OR CONsultant work. Experienced in compounding; lab, factory management; production development; small, large plants. Address Box No. 739, care of INDIA RUBBER WORLD.

DEVELOPMENT AND PRODUCTION OPERATIONS EXECUTIVE covering management, manufacturing, and problem solving. Experience in development of new products in fields of rubber and resin fabric coatings, plastic molding, latex proofing, and other technical and chemical applications. Excellent chemical and engineering background of 25 years' versatile experience. Prefer eastern location. Address Box No. 740, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, COMPOUNDER, DEVELOPMENT ENGIneer. 22 years' experience large and small factories on a wide variety of products. Address Box No. 748, care of INDIA RUBBER WORLD.

BROCKTON TOOL COMPANY

Central Street — **QUALITY MOULDS FOR ALL PURPOSES** — South Easton, Mass.

THE FIRST STEP—A QUALITY MOULD

CLASSIFIED ADVERTISEMENTS

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—6′ x 18′ HIGH-PRESSURE VULCANIZER, QUICK-opening door. RUBBER MILLS, 6″ x 12″, 10″ x 24″, 16″ x 30″, each with motor and drive; 1—32″ x 45″ Hydraulic Press, 24-inch ram. Also Tubers, Vulcanizers, Hydraulic Presses, Calenders, etc. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 7, N. Y. Phone: BArclay 7-0600.

FOR SALE: BANBURY MIXERS, MILLS, CALENDERS, LABORatory Mill and Banbury Unit, Extruders, Tubers, Hydraulic Presses. Send for detailed bulletin. EAGLE INDUSTRIES, Inc., 110 Washington Street, New York 6, N. Y. DIgby 4-8364-5-6.

FOR SALE: FARREL 18″ X 45″, 16″ X 48″, and 15″ X 36″, 2-ROLL Rubber Mills, also new Lab. 6″ x 12″ Mixing Mills and Calenders, & other sizes up to 84″. Rubber Calenders. Extruders 2″ to 3″. Ball & Jewell Rotary Cutters. Sargent 3-apron conveyor, 6-fan Rubber Drier, Baker-Perkins Mixers 200- & 100-gal. heavy-duty double-arm jack., also Lab. & 9-gal. sizes, Impregnating Units Lab. size & up. Large stock Hydraulic Presses for 12″ x 12″ to 42″ x 48″ platens, from 50 to 1500 tons. Hydraulic Pumps & Accumulators. Grinders, Cutters, Crushers, Churns, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT COMPANY, 90 WEST STREET, NEW YORK 6, N. Y.

FOR SALE, DOUBLE-ARM JACKETED MIXERS, SIGMA BLADE—25 gal. to 250 gal.—J. H. Day, W & P, Read, etc. Stokes Rotary 16-punch pellet presses. PERRY EQUIPMENT CORP., 1524 W. Thompson St., Phila. 21, Pa.

FOR SALE: 24 X 66″ FARREL-BIRMINGHAM 3-ROLL CALENder, herringbone geared, bored rolls, rigged for plastic (leatherette and like). Includes smoothing roll, embossing rolls, and cooling rolls, first grade, recently rebuilt. Available for prompt delivery. STEWART BOLLING & COMPANY, INC., 3190 East 65th Street, Cleveland 27, Ohio.

BANBURY PARTS: ROTORS, END FRAMES, ROTOR COLLARS, side jackets, door tops, cylinders, rings, and other parts for Banburys No. 3, No. 3A, No. 9, and No. 11. Every part in A-1 condition. For emergency repairs, or for complete Banbury rebuilding, write or wire INTERSTATE WELDING SERVICE, Office, Metropolitan Building, Akron 8, Ohio.

FOR SALE: 24 X 48 FARREL CALENDER EXTRA-HEAVY DUTY 3-roll — new 1948 — used very little. With Farrel Herringbone Reduction Gear unit, automatic oiler, Herringbone connecting and bull gear. Even and friction speeds, bed plate. No motor or controls. Push-button adjustments. Address Box No. 742, care of INDIA RUBBER WORLD.

FOR SALE: 3-ROBINSON UNIQUE FRIGIDISC GRINDERS WITH 50 hp. 220/440-volt integral motors made by Mercer Robinson Co., New York City—2 new—1 only slightly used. 1-Robinson gyro sifter—slightly used. 2-Thropp 8-opening presses, 36 x 36 steam heated platens—18″ rams for 2,000 lb. W. P. 1-Thropp 4-opening press, 36 x 36 steam heated platens, new 18″ chrome plated ram for 2,000 lb. W. P. 1-#3A Coulter special volumetric blanking machine for heel and sole biscuits—new. 1-Biggs Boiler Works open steam vertical vulcanizer 36″ diam. x 48″ deep with hinged counterbalanced cover—new. 1-Pancorbo chopper-less motor, used. 1-Pancorbo span grinder, used. 2 Lawson 38″ square paper or stock cutters, used. 1—Chandler Price 39″ square paper or stock cutter, used—with motor. Address Box No. 743, care of INDIA RUBBER WORLD.

IMMEDIATE DELIVERY—ROTARY CUTTERS ALL SIZES—Roll Mills—Calenders—Heavy Duty Mixers—What Have You For Sale? Send Us Your Inquiries—For Better Buys & Service Call SOuth 8-4451—You Can BANK On The EQUIPMENT CLEARING HOUSE, INC., 289 10th St., Brooklyn 15, N. Y.

FOR SALE: THREE-ROLL 6″ x 16″ CALENDER COMPLETE WITH motor and drive. Address Box No. 749, care of INDIA RUBBER WORLD.

Economical **NEW** Efficient

Mills - Spreaders - Churns
Mixers - Hydraulic Presses
Calenders

...GUARANTEED...

Rebuilt Machinery for Rubber and Plastics

LAWRENCE N. BARRY

41 Locust Street — Medford, Mass.

AIR BAG BUFFING MACHINERY
STOCK SHELLS — HOSE POLES
MANDRELS

NATIONAL SHERARDIZING & MACHINE CO.
868 WINDSOR ST. — HARTFORD, CONN.
Representatives
Akron — San Francisco — New York

BUYING — SELLING
USED MACHINERY FOR THE **RUBBER**
AND ALLIED INDUSTRIES
MILLS, CALENDERS, HYDRAULIC PRESSES,
TUBERS, VULCANIZERS, MIXERS, ETC.
ERIC BONWITT — 431 S. DEARBORN STREET CHICAGO 5, ILLINOIS

MOLDS

Manufactured to your specifications by highly skilled craftsmen in Western Germany. A century of experience.

CONSULT US ON YOUR REQUIREMENTS.

Transmares Corporation

15 William St. — New York, N. Y.

"ANNALS OF RUBBER"

A Chronological Record of the Important Events in the History of Rubber

— 50c per Copy —

INDIA RUBBER WORLD

386 Fourth Ave. — New York 16, N. Y.

NEW and REBUILT MACHINERY

Since 1891

L. ALBERT & SON

Trenton, N. J., — Akron, Ohio, — Chicago, Ill., — Los Angeles, Calif.

GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS — HYD. PRESSES, PUMPS, MIXERS
VULCANIZERS, ACCUMULATORS — CUTTING MACHINES, PULVERIZERS

UNITED RUBBER MACHINERY EXCHANGE

NEW ADDRESS: 183-189 ORATON ST. — CABLE "URME" — NEWARK 4, N. J.

WANTED

Financially responsible organization will purchase complete sponge and mechanical rubber goods plant with presses, calenders, mills and extruders. Will consider all offers. Please give complete details first letter.
Address Box 555,
c/o INDIA RUBBER WORLD

CUSTOM MIXING

We do milling and compounding of all types — blacks or colors — Master Batches —
All mixing done under careful supervision and laboratory control.

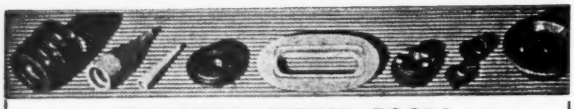
PEQUANOC RUBBER CO.
Phone: Butler 9-0400 BUTLER, NEW JERSEY

BOUGHT — SOLD

Glycols — Cellosolves — Ethanolamines — Titaniums
Zinc Oxide—Dyes—Colors—Chlorinated Solvents
Zinc, Nickel, Cadmium Metals and Chemicals

CHEMICAL SERVICE CORPORATION
80 Beaver St., New York 5 HAnover 2-6970

WANTED — Large engineering firm wishes to acquire several complete Rubber Plants through purchase of (1) capital stock, (2) assets, (3) machinery and equipment, whole or in part. Personnel retained where possible, strictest confidence. Box 1220, 1474 Broadway, New York 18, N. Y.



INDUSTRIAL RUBBER GOODS
BLOWN — SOLID — SPONGE
FROM NATURAL, RECLAIMED, AND SYNTHETIC RUBBER
THE BARR RUBBER PRODUCTS CO. SANDUSKY OHIO

COMPOUNDING INGREDIENTS FOR RUBBER
1947 Second Edition

A must for every compounder, with nearly 2,000 separate items listed. $5.00 in U.S.A.; $6.00 elsewhere. Add 2% sales tax for New York City. INDIA RUBBER WORLD, 386 Fourth Ave., New York 16, N. Y.

HOWE MACHINERY CO., INC.
30 GREGORY AVENUE PASSAIC, N. J.
Designers and Builders of
"V" BELT MANUFACTURING EQUIPMENT
Cord Latexing, Expanding Mandrels, Automatic Cutting, Skiving, Flipping and Roll Drive Wrapping Machines.
ENGINEERING FACILITIES FOR SPECIAL EQUIPMENT
Call or write.

CLASSIFIED ADVERTISEMENTS

Continued

MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE: TWO JACKETED VULCANIZERS WITH QUICK-opening doors, each 18 ft. long x 5 ft. diameter complete with loading cars. Immediate delivery. Address Box No. 750, care of INDIA RUBBER WORLD.

REBUILT BANBURY BODIES, NO. 11, NO. 9, NO. 3A, AND No. 3, spray or jacketed types, for sale or interchange. These bodies are complete with door and cylinder and are in A-1 shape. Write or wire INTERSTATE WELDING SERVICE, Office, Metropolitan Building, Akron 8, Ohio.

BUSINESS OPPORTUNITIES

NEW PRODUCTS WANTED — WE ARE PREPARED TO MANUfacture, finance, and distribute any sound rubber item with sales potential in the automotive and plumbing fields. Give details in first letter. RADIATOR SPECIALTY COMPANY, Rubber Division, Charlotte, N. C.

FACTORY FOR SALE OR RENT. GOING RUBBERIZED PLANT fully equipped Spreaders, Calenders, Mills, Embossing Machines, Vulcanizers, Churns, and other equipment. Principals only. Address Box No. 741, care of INDIA RUBBER WORLD.

BOSTON MANUFACTURER'S AGENT WITH ENGINEERING background, now handling process equipment to rubber and plastics industries in New England, desires additional equipment or material account. Address Box No. 745, care of INDIA RUBBER WORLD.

FOR SALE: LARGE MANUFACTURING PLANT, 7 MILLS, Banbury mixer, large sponge presses, 25 presses 36" x 36", 3 vulcanizers, tubing machines, calender machines, rubber cement churns, no unions, must have $750,000.00 in cash. Address Box No. 752, care of INDIA RUBBER WORLD.

MIXING AND MASTICATION CAPACITY AVAILABLE to customers' specifications on No. 3A Banbury Type Machine. We are manufacturers of Molded, Lathe Cut, and Extruded Soft Rubber Goods and have surplus mixing capacity.

MARTIN RUBBER COMPANY
Long Branch Ave., Long Branch, N. J.
Telephones: Long Branch 6-1221-1222

CONSULTANTS & ENGINEERS

BERLOW AND SCHLOSSER CO.
Consultation and Technical Service
Paper, Textile and Wringer Rolls—Mechanicals
Molded Specialties—Cut Rubber Thread
401 INDUSTRIAL TRUST BUILDING
PROVIDENCE 3, R. I.

GIDLEY LABORATORIES, INC.
PHILIP TUCKER GIDLEY — "RESEARCH IN RUBBER"
Consulting engineering, formulas, product development, chemical and physical tests and factory surveys.
Fairhaven Massachusetts

EXPERIMENTAL COMPOUNDING and PROBLEM SOLVING

Can you replace natural rubber with GR-S and maintain the quality of your product?

Are you interested in evaluating any of the new rubber chemicals in your formulas?

Are customers and prestige being lost because of unexplained production failures?

We are well prepared — in both experience and equipment — to undertake compounding studies. We can handle assignments in trouble shooting and product development involving any plastic or elastomeric material.

Ask For Mr. Hewitt

FOSTER D. SNELL, Inc.
29 West 15th Street New York 11, N. Y.
WA 4-8800

INDEX TO ADVERTISERS

This index is maintained for the convenience of our readers. It is not a part of the advertisers' contract and INDIA RUBBER WORLD *assumes no responsibility to advertisers for its correctness.*

A

A-C Supply Co., The 662
Adamson United Co. ..Insert 665
Advance Solvents & Chemical Corp. 716
Akron Equipment Co., The 668
Akron Rubber Machinery Co. ..... —
Albert, L., & Son 739
Alco Oil & Chemical Corp. 664
Aluminum Flake Co. 737
American Cyanamid Co., Calco Chemical Div. Insert 717, 718
American Polymer Corp. .. —
American Resinous Chemicals Corp. ..... —
American Zinc Sales Co. .. —
Ames, B. C., Co. ..... —

B

Baird Rubber & Trading Co. 733
Barr Rubber Products Co., The 740
Barrett Division, The (Allied Chemical & Dye Corp.) ..... —
Barry, Lawrence N. 739
Beacon Co., The ..... —
Berlow and Schlosser Co. 737, 740
Binney & Smith Co. Insert 699, 700
Black Rock Mfg. Co. 729
Bolling, Stewart, & Co., Inc. 660
Bonwitt, Eric 739
Bridgwater Machine Co., The (Athens Machine Division) ..... —
Brockton Tool Co. 738
Brooklyn Color Works, Inc. —
Brown Co. 634
Burgess Pigment Co. .... —

C

Cabot, Godfrey L., Inc. Front Cover, 731
Cambridge Instrument Co., Inc. 733
Cameron Machine Co. 711
Carter Bell Mfg. Co., The.. 658
Chemical Service Corp. ... 740
Claremont Waste Mfg. Co. 729
CLASSIFIED ADVERTISEMENTS 738-740
Cleveland Liner & Mfg. Co., The .....Back Cover
Colledge, E. W., General Sales Agent, Inc. ..... —
Colonial Insulator Co., The 724
Columbian Carbon Co. Insert 699, 700
Mapico Color Division .. 719
CONSULTANTS & ENGINEERS 740
Curran & Barry 725

D

Diamond Alkali Co. ..... —
Diamond Metal Products Co. ..... —
Dow Corning Corp. 715
du Pont de Nemours, E. I., & Co., Inc.:
Grasselli Chemicals Dept. 662
du Pont de Nemours, E. I., & Co., Inc.:
Organic Chemicals Dept., Aromatics Section .... —
Rubber Chemicals Div. Inside Front Cover

E

Eagle-Picher Co., The 737
Emery Industries, Inc. 649
Erie Engine & Mfg. Co. .. —
Erie Foundry Co. ..... —

F

Falls Engineering & Machine Co., The 655
Farrel-Birmingham Co., Inc. 641
Ferry Machine Co. (Wills Rubber Trimming Division) .....
Fidelity Machine Co., Inc. 712
Flexo Supply Co., The .... —
Flintkote Co., The 659
French Oil Mill Machinery Co., The 668

G

Gammeter, W. F., Co., The 737
General Atlas Carbon Co., The 651
General Electric Co. (Chemical Dept.) 650
General Latex & Chemical Corp. 722
General Tire & Rubber Co., The 664
Genseke Brothers ..... —
Gidley Laboratories, Inc. .. 740
Goodrich, B. F., Chemical Co. (Chemicals) 631
Goodrich, B. F., Chemical Co. (Hycar) ..... —
Goodyear Tire & Rubber Co., Inc., The, (Chemical Division) 635, 645

H

Hadley Bros.—Uhl Co. .. —
Hall, C. P., Co., The 663
Hardesty Chemical Co., Inc. 737
Hardman, H. V., Co., Inc. —
Harwick Standard Chemical Co. 657
Heveatex Corp. ..... —
Hoggson & Pettis Mfg. Co., The 724
Holliston Mills, Inc., The .. —
Home Rubber Co. 664
Howe Machinery Co., Inc. 740
Huber, J. M., Corp. 670

I

Independent Die & Supply Co. 737
Indoil Chemical Co. ..... —
Industrial Ovens, Inc. .. 647
Institution of the Rubber Industry 658
Interstate Welding Service —

J

Johnson Corp., The 733

K

Koppers Co., Inc. ..... —

L

Littlejohn & Co., Inc. 731

M

Magnolia Metal Co. ..... —
Marbon Corp. 652
Marine Magnesium Products Corp. 731
Martin Rubber Co. 740
Monsanto Chemical Co. .. —
Morris, T. W., Trimming Machines 669
Muehlstein, H., & Co., Inc. 713

N

National Erie Corp. ..... —
National Lead Co. 666
National Rubber Machinery Co. ..... —
National Sherardizing & Machine Co., The 739
Naugatuck Chemical, Division of U. S. Rubber Co. 633
Neville Co., The ..... —
New Jersey Zinc Co., The 642

O

Osborn Manufacturing Co., The ..... —

P

Pan American Chemicals, Division Pan American Refining Corp. ..... —
Pennsylvania Industrial Chemical Corp. 661
Pequanoc Rubber Co. 636, 637, 740
Phillips Chemical Co. 632, 714, 719, 725
Pike, S. J., & Co., Inc. .. —
Pittsburgh Plate Glass Co., Columbia Chemical Div. 735
Polymel Corp., The 638

R

Rand Rubber Co. ..... —
Rare Metal Products Co. 733
Richardson, Sid, Carbon Co. 742
Royle, John, & Sons 660
Rubber Corp. of America (Latex Division) 729

S

St. Joseph Lead Co. ..... —
Schulman, A., Inc. Inside Back Cover
Scott Testers, Inc. 714
Sharples Chemicals Inc. .. 667
Shaw, Francis, & Co., Ltd. 646
Simplex Cloth Cutting Machine Co., Inc. 668
Skelly Oil Co. 644
Snell, Foster D., Inc. 740
Socony-Vacuum Oil Co., Inc. ..... —
South Asia Corp. 668
Southeastern Clay Co. 729
Southern Clays, Inc. .... —
Southland Cork Co. ..... —
Spadone Machine Co., Inc. 731
Spencer Products Co., The —
Stamford Rubber Supply Co., The 656
Standard Machinery Co., The ..... —
Stanley Chemical Co. 656
Stauffer Chemical Co. 723
Sun Oil Co. ..... —

T

Taylor Instrument Cos. .. 721
Testworth Laboratories, Inc. 725
Textiles Proofers, Inc. .... —
Thropp, Wm. R., & Sons Co. 720
Timken Roller Bearing Co., The 709
Titanium Pigment Corp. .. 648
Transmares Corp. 739
Tumpeer Chemical Co. .... —
Turner Halsey Co. 653

U

United Carbon Co., Inc. Insert 639, 640
United Engineering & Foundry Co. ..... —
United Rubber Machinery Exchange 739
U. S. Rubber Reclaiming Co., Inc. ..... —

V

Vanderbilt, R. T., Co., Inc. 672

W

Wade, Levi C., Co. ..... —
White, J. J., Products Co. —
Whittaker, Clark & Daniels, Inc. 722
Williams, C. K., & Co. .... —
Wilson, Charles T., Co., Inc. 720
Witco Chemical Co. 727
Wood, R. D., Co. ..... —
Wyandotte Chemicals Corp. 643

...at close range

The closer the Indian got to his target, the surer he was that the arrow would strike accurately and with sufficient force.

You are closer to your "target" of quality production at the most economical cost when you depend upon ***TEXAS "E"*** and ***TEXAS "M"***, highest quality channel blacks.

With the world's largest channel black plant and available nearby natural resources, the Sid Richardson Carbon Co.,can assure you a continuous supply of these constantly uniform and economical-to-use blacks.

TEXAS
CHANNEL BLACKS

Sid Richardson
CARBON CO.
FORT WORTH, TEXAS

GENERAL SALES OFFICES
EVANS SAVINGS AND LOAN BUILDING
AKRON 8, OHIO

KEEP CALLING your nearest SCHULMAN office for SCRAP RUBBER

It's easy to dial Schulman for Scrap Rubber. This one call can put you in touch with whatever you need in Scrap Rubber . . . from the answer to your special requirements to quotations and date of delivery. Modern Schulman plants are strategically located coast to coast and equipped to supply Scrap Rubber the way you want it. A telephone call will prove to you . . . it PAYS to FIRST CALL SCHULMAN for Scrap Rubber!

AKRON HEmlock 4124

NEW YORK LOngacre 4-5960

BOSTON LIberty 2-2717

EAST ST. LOUIS BRidge 5326

A. Schulman Inc.

Rubber and Plastics

MAIN OFFICE AND PLANT: 790 E. TALLMADGE AVE., AKRON 9, OHIO

AKRON, OHIO • NEW YORK CITY • BOSTON, MASS. • JERSEY CITY, N. J.

E. ST. LOUIS, ILL. • HUNTINGTON PARK, CALIF.

NEW YORK CITY 500 Fifth Ave. • **AKRON, O.** 790 E. Tallmadge • **BOSTON, MASS.** 738 Statler Bldg. • **E. ST. LOUIS, ILL.** 14th & Converse

The spotlight is on

LINERETTE *Paper*

the star performer
for separating lightweight stocks

Since 1925, Linerette has provided a quick and easy way to separate stock without adhesion. This quality, specification sheet preserves the tackiness of the stock and contains no oil or wax which might migrate.

LINERETTE is furnished in any width up to and including 54", in rolls of 9", 11½", 13", and 15" diameters; put up on 3" i. d. cores. The yield is approximately six square yards to the pound. A 9" roll contains 375 linear yards and a 15" diameter about 1150 linear yards.

SAMPLES SENT ON REQUEST— *simply specify width desired.*

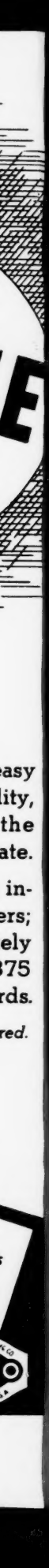
ILLUSTRATED LINER BOOKLET

Tells all about Climco Liners and Linerette and how to get better service from liners. Write for your copy now.

THE CLEVELAND LINER & MFG. CO.
5508 Maurice Ave. • Cleveland 4, Ohio, U. S. A.
Cable Address: "BLUELINER"

West Coast Representative
MERIT WESTERN COMPANY
1248 Wholesale St.,
Los Angeles 21, Calif.

MADE BY THE MANUFACTURERS OF CLIMCO PROCESSED LINERS

LINERETTE
INTERLEAVING PAPER

CLIMCO
THE CLEVELAND LINER & MFG. CO.
CLEVELAND, OHIO U.S.A.